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Report

New Hampshire. State Dept. of Health

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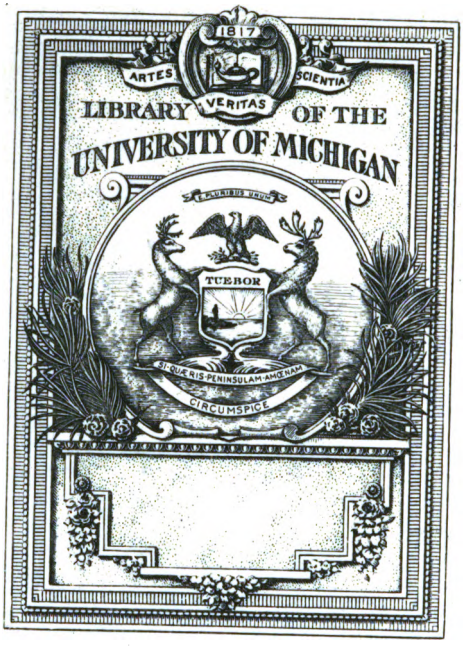

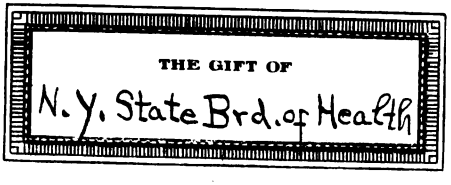

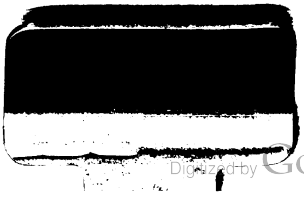

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TWENTY-SECOND REPORT

(NINTH BIENNIAL)

OF THE

New Hampshire

STATE BOARD OF HEALTH

OF THE

STATE OF NEW HAMPSHIRE

FOR THE FISCAL PERIOD ENDING AUGUST 31, 1912

CONCORD, NEW HAMPSHIRE
1912

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STATE OF NEW HAMPSHIRE.

OFFICE OF THE STATE BOARD OF HEALTH,
STATE HOUSE, CONCORD, September 1, 1912.

To His Excellency the Governor and the Honorable Council:

I have the honor to submit herewith, in accordance with the laws of the State of New Hampshire, the twenty-first report of the State Board of Health for the two fiscal years ending August 31, 1912.

Respectfully submitted,

Irving A. Watson

Secretary.

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REPORT.

The report of the State Board of Health for the two fiscal years 1911 and 1912 herewith presented, exhibits only some of the more prominent features of the work of the board during that period, it being practically impossible to present all of its activities within the space and available appropriation for its biennial report.

There is an almost daily demand upon the board for advice, information or official aid, involving executive or advisory action, necessitating a large correspondence with local boards of health, various other organizations and private individuals, relative to the prevention or management of communicable diseases, the protection of water supplies, sanitary improvement of summer resorts, the interpretation of food and drug laws and regulations, and many other things of general or local importance—all of which can be given only a passing notice in this report.

But little can be presented of the inspection which has been done during the past two years under authority of the board, extending as it has to the investigation of conditions prevailing at slaughter-houses, dairies, bakeries, fruit and grocery stores, and at other places where food supplies are produced or offered for sale. Such work is of great importance, but it cannot be represented in a report of this kind.

The last Legislature placed an extra duty upon the State Board of Health, in that it constituted the board the only health authority in the unincorporated localities of the state, and in this capacity the board has had to assume the management of smallpox in one instance, as is shown elsewhere in this volume, and in another to provide for the care of a few cases of diphtheria.

Each session of the Legislature adds something to the duties of the board, and that of 1911, in enacting the law for the Sanitary Production and Distribution of Food Supplies, increased the work very materially.

Registration of Vital Statistics.

The State Board of Health constitutes a Department of Vital Statistics, to which a return is made of births, marriages, divorces, and

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deaths from every town and city in the state, and a statistical volume, embracing such tables as may facilitate the study of the movement of the population, is published biennially. These tables, which now cover a period of nearly thirty years, are exceedingly valuable in the study of the prevalence and distribution of diseases, and birth, marriage and divorce records, with the features connected therewith.

Some facts connected with the statistics of the biennial period, especially such as relate to the more common communicable diseases, are herewith given. The following table shows the number of births, marriages, divorces, and deaths returned to the state during the fiscal years 1910 and 1911:

	1910.	1911.	Increase.	Decrease.
Births	9,386	8,993	.....	393
Marriages	5,110	4,340	.....	770
Divorces	555	588	33	.....
Deaths	7,455	7,410	.....	45

The following table shows the rate of births, marriages, and deaths for the two years, 1910, 1911, to each 1,000 of the population of the state:

Year.	Births.	Marriages.	Deaths.
1910	21.79	11.8 (couples)	17.31
1911	20.79	10.0 (couples)	17.13

The Quarterly Bulletin of the State Board of Health.

From January, 1900, to January, 1912, the State Board of Health issued a quarterly bulletin under the title of *New Hampshire Sanitary Bulletin*, but at the last named date the name was changed to *Quarterly Bulletin of the State Board of Health of New Hampshire*. The change was made chiefly because the articles published in the *Bulletin*, particularly those relating to food analyses, are generally recognized by authorities outside of the state, and credit was given to the *Sanitary Bulletin*, which title did not show whether it was a private or an official publication; hence, the board was not getting credit for the work it was doing.

The public appreciation which the *Bulletin* has received and is receiving, is a gratifying feature of the work of the board. The demand

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for copies has increased so that at the present time the regular issue is approximately 7,000 copies.

Tuberculosis.

The Legislature of 1911 enacted a law providing for the registration of all cases of tuberculosis with the State Board of Health, and directing that a copy of the act, and of an act entitled, "An act to prevent the spread of consumption," approved February 14, 1905, be sent to all registered and licensed physicians and local boards of health in the state, and, further, to send to persons in charge of cases of tuberculosis (unless otherwise requested by the attending physician,) instructions as to measures to be employed to prevent the spread of the disease. Following is the law:

Section 1. It shall be the duty of every physician practicing medicine or surgery in the State of New Hampshire to report in writing to the state board of health, within one week after the disease is recognized, on forms to be provided by the said board, the name, age, sex, color, occupation and address of every person under his care in this state who is, in his opinion, infected with pulmonary or other form of tuberculosis. It shall also be the duty of the officer having charge for the time being of each and every hospital, dispensary, asylum or other public or private institution in the state to report in like manner the name, age, sex, color, occupation and last address of every person in his care or who has come under his observation within one week of such time, who in his opinion is infected with pulmonary or other form of tuberculosis.

Sect. 2. The state board of health shall provide for an immediate bacteriological examination at the state laboratory of hygiene of all samples of sputum forwarded by physicians for the purpose of determining suspected cases of tuberculosis in this state free of charge, and shall report results promptly to the physicians who sent the specimen. In negative results, successive examinations shall be made from time to time so long as the attending physician may be of the opinion that the case may be tuberculosis.

Sect. 3. The state board of health shall cause all cases showing the presence of tubercle bacilli to be recorded in a register, of which the board shall be the custodian and which shall not be open to inspection, nor shall the board permit any such record to be divulged in any manner to disclose the identity of the person to whom it relates, except to a health officer, if deemed necessary, to carry out the provisions of this act.

Sect. 4. It shall be the duty of the state board of health in every case where a bacteriological examination reveals the existence of tuberculosis, to supply to such person or to those in charge of such person, unless otherwise requested by the attending physician, instructions as to the methods to be employed to prevent the spread of the disease.

Sect. 5. Upon the recovery of any person who has been found to be infected with tuberculosis, a report to that effect shall be made to the state board of health by the attending physician, and shall be recorded in the register aforesaid, and shall relieve the said person from further liability to any requirement imposed by this act.

Sect. 6. As soon as practicable after the passage of this act, the state board of

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health shall transmit to every registered or licensed physician in the state, to every board of health, and to such institutions as are mentioned, a copy of this act, together with a copy of chapter 17, Laws of 1905, entitled, "An Act to prevent the spread of consumption," and providing for disinfection after death from pulmonary consumption, or the removal of a consumptive patient.

SECT. 7. Any person violating the provisions of this act shall, upon conviction thereof, be deemed guilty of a misdemeanor and shall be punished by a fine of ten dollars, or imprisonment for thirty days, or both.

SECT. 8. All acts and parts of acts inconsistent with this act are hereby repealed, and this act shall take effect upon its passage.

Approved February 8, 1911.

Soon after the enactment of this law, the State Board of Health transmitted a copy of it, together with report blanks, to every physician in the state, and also a copy of the law, with recommendations, to the local boards of health.

Under the requirements of this act 828 cases of tuberculosis have been reported. The returns, classified by towns, make it apparent that some physicians have neglected to make such returns, or have overlooked the requirements of the law. Further effort will be made to secure complete registration of cases.

If we add to the above figures the number of positive cases determined by laboratory examination of sputum and not otherwise reported, we have a total of 1,405 cases accounted for since the law went into effect. It is possible that some physicians have considered the record sent with the specimen of sputum a sufficient registration of the case.

Circulars of instruction have been sent out in accordance with the provisions of the law.

An examination of the registration reports shows that the mortality from tuberculosis has been very materially reduced during the period in which the returns have been sufficiently accurate to be reliable—from 1884 to the present time. The deaths from pulmonary tuberculosis during that period aggregate 18,034. In the earlier years of the period named, the annual deaths returned from this disease aggregated rising 800. There has been a gradual diminution in the mortality down to 433 deaths returned in 1911, the lowest mortality from tuberculosis ever returned. In other words, basing the mortality on each 10,000 of the population, it has been reduced from 24.10 to 10.01.

The Legislature of 1911, by concurrent resolution, created a commission consisting of five persons to investigate the subject of tuberculosis and to make such recommendations as might be deemed advisable. The report of the commission to the Legislature embraces the following recommendations:

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"1. That the New Hampshire State Sanatorium be enlarged, and an appropriation sufficient for its maintenance be made, to meet the growing demand for admission to that institution.

"2. That the state provide ample means for the care of advanced cases of tuberculosis, especially those belonging to the indigent class.

"3. That the Legislature make provision for the placing, as far as practicable, in the hands of every family in the state, information in the shape of circulars, bulletins or pamphlets giving specific instructions relative to the prevention and restriction of tuberculosis and the sanitary care of persons infected with the disease."

Diphtheria.

The mortality from diphtheria since the introduction of antitoxin has apparently been reduced more than 50 per cent., and unquestionably might be still further greatly diminished if this agent could be administered early in every case.

The deaths from diphtheria for the calendar year 1910, for the entire state, numbered 71, and in 1911, 67. The regulations governing the sanitary management of this disease, require that the premises occupied by the patient shall be placarded until complete recovery, and that before the quarantine is raised the rooms occupied by the patient and his attendants shall be thoroughly disinfected.

Elsewhere in this report will be found remarks upon the laboratory work in the examination of cultures, etc. The examinations demonstrate beyond question the impossibility of determining clinically the nature of the infection in throat affections, particularly in the milder forms. We would especially call the attention of physicians to this point.

In the figures given above are included deaths from membranous croup, which is another term for laryngeal diphtheria.

Typhoid Fever.

The number of deaths reported from typhoid fever for the year 1910 was 42; for 1911, 53. In studying the statistics of this disease for the past twenty-eight years—as far back as the registration records show the mortality—we find that the death rate has been materially reduced in recent years. The average annual number of deaths from typhoid fever for the past ten years was 63.3; for the ten years prior to that period, 108.4, and for the eight years still earlier, to 1884, the average mortality was 152.1.

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It is needless to say that sanitary improvements largely account for the diminution in the mortality, particularly the protection of water supplies, the sanitary care of milk, and a better understanding of the nature of the disease with the consequent greater precautions taken in connection with the individual case.

During the past two years there was only one instance in this state in which typhoid could really be called epidemic. An account of that is given elsewhere in this report.

It is difficult, often, to trace the source of the so-called sporadic cases. There are at least three ways in which typhoid may be distributed unknowingly, which may often account for the independent or individual cases that appear, as well as for the epidemic outbreaks. They may be enumerated as follows:

1. Persons who are immune to the disease, or, in other words, have sufficient resistance to neutralize the infection and, therefore, are not made ill; but they constitute unrecognized distributors of the typhoid bacillus.

2. Persons whose resistance is only partial and are slightly ill, and who constitute traveling or "walking" cases, so called.

3. Persons who have recovered from an attack of typhoid, but who may harbor the typhoid bacillus for months, and even years, as has been proven,and who, therefore, unconsciously distribute the infection.

Scarlet Fever.

The mortality from this disease fluctuates more or less, depending upon whether or not it becomes epidemic in any locality. In 1910 eight deaths were returned; in 1911, sixteen deaths. The average annual number of deaths for the past ten years was 8.9, and for the ten years preceding, 37.7.

A special bulletin on the restriction and prevention of scarlet fever has been extensively distributed by the State Board of Health, and is furnished to local boards of health as well as to individuals upon request. Isolation and disinfection, together with a better knowledge of the disease, have doubtless produced the better results in recent years.

Measles.

During the calender years 1910 and 1911, twenty deaths from measles were returned to the state. In a period of ten years, from 1902–11, inclusive, there were reported 117 deaths from this disease. Of this number, 83 were under five years of age, and 14 were between five and ten years. It will, therefore, be seen (and statistics show the

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same to be true in other states), that the greater mortality from measles is in early childhood.

The figures given do not by any means show the number of deaths that occur as a result of measles. It is known to the medical profession that many complications follow and result fatally which are not classed under the term "measles." For instance, pneumonia is a very frequent complication of measles.

The fact that the most communicable period of the disease is the earlier or prodromal stage, renders it very difficult to make effective restrictive measures, since it is not recognized until exposure has been great, especially in schools.

Health authorities generally regard placarding as of some benefit. In this state, the placard contains the only regulation that has been promulgated for the control of this disease, and is as follows:

"Any person having the Measles, however mild the case may be, and all persons in a family where Measles exist, EXCEPT THOSE WHO HAVE HAD THE DISEASE, are forbidden to attend school or any public or private gathering, or to mingle with persons who have not had the disease.

"Persons who have not had Measles are forbidden from entering these premises.

"All persons are strictly forbidden to remove this card without orders from the Board of Health.

"Any violation of these regulations will be punished to the fullest extent of the law."

It is the general practice to keep the card posted for two weeks, at the end of which time, if there are no other cases, it may be removed and the quarantine raised, without disinfection.

The records show that this disease is by no means inconsequential, and it is certainly our duty to protect the young as far as possible against its infection.

WHOOPING-COUGH.

Whooping-cough, against which practically no restrictive measures are taken, is a disease the fatality of which is undoubtedly greater than is generally recognized. During the past ten years there have been returned 288 deaths from this disease. Its fatality is confined almost entirely to very young children, infants largely. Two hundred and ten of these deaths were in children under one year of age; 70 between one and five years of age; 7 from five to ten years, and 1 between ten and twenty years.

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The lesson to be learned from the statistics is that if the infant or very young child can be protected from the infection of whooping-cough, its life is practically safe so far as this disease is concerned.

Poliomyelitis.

(*Infantile Paralysis.*)

Poliomyelitis is a disease that has been brought prominently to public attention during the past few years, and in a manner that has unduly and needlessly alarmed the people.

While this disease is of a grave character, and one to which much attention and study has been given, quite properly, it has been shown to be only slightly, if at all, communicable from person to person, and to carry a mortality far less than that of some of the more commonly prevailing diseases to which the public pay little or no attention.

The following table is a compilation of the deaths reported in this state during the calendar years 1909, 1910, 1911, and 1912.

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INFANTILE PARALYSIS, NEW HAMPSHIRE.

Place.	Date.	Age.		
	1909.	Years.	Mos.	Days.
Nashua	Jan. 3	5	5	..
Surry	Jan. 15	1	6	23
Sunapee	May 1	3	2	27
Dover	May 9	79	8	11
Manchester	Aug. 5	21	0	11
Portsmouth	Sept. 2	16	8	..
Concord	Sept. 13	25	8	16
Franklin	Oct. 10	7	3	4
Manchester	Oct. 21	12	11	130
Manchester	Nov. 22	64	0	
	1910.			
Manchester	Jan. 31	2	11	27
Lempster	Feb. 21	8	1	13
Lebanon	Feb. 25	2	1	25
Pembroke	March 18	0	11	12
Seabrook	May 20	3	0	15
Keene	July 19	20	5	26
Warren	July 24	2	9	24
Greenfield	Aug. 20	1	2	20
Belmont	Sept. 2	20	10	15
Hinsdale	Sept. 19	11	1	20
East Kingston	Oct. 3	0	3	18
Dover	Oct. 6	5	11	10
Laconia	Oct. 7	20	3	7
Concord	Oct. 9	35	1	19
Newmarket	Oct. 11	0	7	0
Landaff	Oct. 19	0	5	25
Deerfield	Oct. 21	3	0	29
Keene	Dec. 5	1	7	12
Manchester	Dec. 10	3	5	22
Manchester	Dec. 20	1	3	28
Manchester	Dec. 27	0	6	8
	1911.			
Wilton	Jan. 9	18	3	1
Pembroke	Feb. 2	71	3	10
Laconia	Feb. 17	1	7	0
Brookfield	March 1	18	4	16
Manchester	March 5	19	0	0
Ashland	March 9	16	7	21
Milford	April 4	14	8	9
Manchester	May 13	0	8	0
Manchester	June 30	2	4	0
Milford	July 16	14	8	5
Milford	Aug. 3	12	4	8
Charlestown	Sept. 5	13	10	22
	1912.			
Concord	June 4	24	0	0
Portsmouth	June 22	12	11	9
Keene	Aug. 11	1	6	0
Jaffrey	Sept. 24	13	6	9
Winchester	Sept. 27	0	10	15
Unity	Oct. 31	14	9	26
Manchester	Oct. 25	4	11	11

The table gives the locality of each case, the date of death, and the age of the decedent. It will be seen that the cases were widely distributed throughout the state, and it is significant of the assertion already made, that only one death has occurred in many of the localities, and no second death in the same family. Had the disease been readily communicated, we should have expected many more cases, if not, indeed, an epidemic in some localities.

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As to the origin of individual cases, there have been many theories, more or less speculation, and up to the present time, it may perhaps be stated that the question is still an unsettled one, although recent careful investigations, while not absolutely conclusive, point to the stable fly as the only carrier of the disease definitely proven by experimentation.

In 1910, Hill, of Minnesota, made a most careful and thorough investigation of this disease without coming to a definite conclusion as to the source of the infection; but, from the standpoint of recent observations, made the significant statement that it was found to be prevalent among some of the horses of that state.

Later investigations made under the authority of the State Board of Health of Massachusetts, led to the suspicion that the stable fly (*Stomoxys Calcitrans*) played an important part in the spread of the disease.

Still later, Dr. M. J. Rosenau of the Harvard Medical School inoculated several monkeys with the disease, and then exposed them daily to the bites of several hundreds of stable flies, at the same time exposing twelve fresh monkeys to the bites of the same flies. Six of these monkeys developed the characteristic symptoms of poliomyelitis; two of them died; three were paralyzed for a time, and one recovered after a brief illness. Subsequent experiments were made which corroborated the first.

The United States Public Health Service, in summarizing an account of the experiments made, states that it appears to be demonstrated conclusively that poliomyelitis may be communicated through the agency of the stable fly, and, that it remains for further work to demonstrate whether this is the usual and only method of its transmission.

We recommend, however, that all the sanitary precautions necessary for the protection of others be exercised in this disease, although a strict quarantine would seem to be unnecessary. In other words, the use of disinfectants, and such general precautions as are commonly exercised in typhoid fever, should be observed in this disease.

Smallpox.

During the fiscal years 1911–1912, 281 cases of smallpox were reported to the State Board of Health. The following table shows the towns and the number of cases reported from each:

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Small-Pox Cases Reported, 1911–1912.

Albany	7	Laconia	31
Allenstown	1	Lincoln	1
Andover	1	Manchester	41
Ashland	19	Meredith	4
Belmont	8	Milan	2
Berlin	26	Nashua	23
Center Harbor	5	Northfield	4
Conway	3	New Ipswich	1
Epping	1	Northumberland	1
Errol	7	Plymouth	1
Franklin	47	Portsmouth	2
Gorham	1	Stewartstown	2
Grafton	2	Tilton	7
Haverhill	1	Tuftonboro	1
Hudson	1	Warren	1
Jackson	7	Woodsville	7
Jefferson	1	Sargent's Location	14
			281

The Legislature of 1911 enacted a law requiring the State Board of Health to take charge of communicable diseases in the unincorporated localities of the state, and, therefore, the fourteen cases in Sargent's Location were looked after by the board, and the expense connected therewith was charged to the State Epidemic Fund.

The state has been obliged to be to an expense of nearly $3,000 during the two years on account of smallpox. The little town of Jackson was put to an expense of over $2,200 on account of an outbreak of smallpox in a lumber camp in that town. We are probably well within bounds in stating that smallpox during the two-year period has entailed an expense upon the state and the towns of not less than $10,000—all of which might have been and should have been avoided through vaccination.

Every person has it within his own power to protect himself from smallpox, and it is a question how much longer quarantine will be maintained against this disease. It has already been abandoned in some states. It would seem to be not unreasonable to place the responsibility of protection upon the individual, for in vaccination he has absolute protection.

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Rabies.

Several cases of rabies occurred in animals during the past two years, and one fatal case in a human being. The heads of thirteen dogs were sent to the laboratory for examination for the Negri bodies characteristic of this disease, and eight of them proved positive. They were received from the following places: New Ipswich, Salem, Derry, Weare, Manchester, Hudson, Concord, Hillsborough, Bennington, New Boston and Pittsfield.

In addition to the above, the heads of two pigs, three sheep and one goat were examined, all of them proving positive. In another instance, several sheep which had been bitten were destroyed on account of rabies.

Apparently, the disease has been more prevalent during the past two years in this state and in many other sections of the country than heretofore. In every instance where a dog is suspected of having rabies, he should be chained up until the nature of the disease is determined, and whenever a dog is killed under a suspicion of having rabies, this board would request that the head be sent to the State Laboratory of Hygiene for examination.

Town authorities should restrict the running loose of dogs that are not looked after by owners. In most of the instances referred to above, the infected dogs were unknown, and nearly all of them without a collar showing any identification. We should recommend that a more careful watch be maintained and that a severer restriction be placed upon dogs running at large.

Public and Private Water Supplies.

In this report considerable space is devoted to public and private water supplies, including detailed account of analyses made in the chemical department of the laboratory of the board, as well as a report upon the topographical situation of some supplies, and rules and regulations adopted to protect them.

The tabular report upon the public water supplies of cities and towns includes the records of four or five years past, for the purpose of comparison. Earlier records may be found in prior reports, a total of thirteen years being covered, which, by comparison, exhibit any fluctuations that may have occurred in the quality of the water, and which are recognized by boards of health and boards of water commissioners as valuable for reference purposes.

During the past two years, there were analyzed in the laboratory

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of the board, 2,089 samples of water obtained from various sources, 445 being from town and city supplies, and the remainder, 1,644, were from summer hotels, schools, industrial establishments, and private sources.

Special rules and regulations were promulgated by the State Board of Health, under authority of the statutes, upon the representation of legal petitions and after a careful examination of the localities, for the protection of the purity of the waters of Gilman Pond in the town of Unity, which is the source of the public water supply of the town of Claremont; and of Long Pond and Keyzer Pond in the town of Sutton. Special examinations were also made in connection with the water supply of Farmington, Hudson, Meredith, Laconia and Nashua, detailed reports upon which will be found elsewhere in this volume.

Food and Drug Work.

During the fiscal period represented in this report, 1,575 food and drug analyses were made in the laboratory, 1,154 of which were food examinations, and 421 drug products. This does not include the analytical work done upon liquors for the State License Commission. For a complete report of this work see page 171.

Bacteriological Work.

During the biennial period, 8,666 bacteriological examinations were made, not including water and milk examinations, which are included in the chemist's report. Of the examinations made, 2,586 were in suspected cases of tuberculosis; 3,392 were throat cultures to determine the character of infection; for typhoid, 846; suspected gonorrhœa, 242, and 60 miscellaneous.

A more detailed account of this work may be found elsewhere in this report, showing towns from which specimens were received, the number of positives and negatives, and, under tuberculosis, ages and sex are given in the positive cases.

Some of these tables must be especially interesting to physicians, particularly those relating to diphtheria, showing the impossibility of making a positive diagnosis in many cases from clinical symptoms.

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The Common Drinking Cup.

At the last session of the Legislature the following bill was passed:

An Act entitled "An Act to restrict the Use of Common Drinking Cups."

Be it enacted by the Senate and House of Representatives in General Court convened:

Section 1. In order to prevent the spread of communicable diseases the state board of health is hereby authorized to prohibit in such public places, vehicles, or buildings as it may designate the providing of a common drinking cup and the board may establish rules and regulations for this purpose.

Sect. 2. Whoever violates the provisions of this act, or any rule or regulation of the state board of health made under authority hereof, shall be deemed guilty of a misdemeanor and be liable to a fine not exceeding twenty-five dollars for each offense.

Sect. 3. All acts and parts of acts inconsistent herewith are hereby repealed.

Sect. 4. This act shall take effect on its passage.

Chapter 2, Laws, of 1911.

Under authority of this act and after due consideration and investigation the State Board of Health, at a meeting held at the State House on February 7, 1912, issued the following:

REGULATION No. 1, RELATING TO THE COMMON DRINKING CUP.

Whereas, It has been repeatedly demonstrated that the use of what is known as the common drinking cup is dangerous, and is an undoubted source of communication of infectious diseases;

Now, therefore, in the interests of public health, be it ruled by the State Board of Health of New Hampshire,

That the use of the common drinking cup on railway trains, in railway stations, in public and private schools, and the state educational institutions of New Hampshire, is hereby prohibited from and after July 1, 1912.

No person, board or corporation in charge or control of any railroad train or station, or public, parochial, or private school, or state educational institution, shall furnish any drinking cup for public use. And no such person, board or corporation shall permit on said railroad train or station, or at said public, parochial, or private school, or state educational institution, the use of the common drinking cup.

A copy of the foregoing order was mailed to the General Managers and Division Superintendents of our railroads and also to every Board of Education in the state. Besides it was generally published in the newspapers.

This is only the beginning of a campaign to suppress the public drinking cup, which is now recognized as a source of great danger in the spread of certain communicable diseases. The railways and the schools have been included in the first order, because they repre-

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sent the greatest collective groups in which sanitary reform in this respect is required. It is probable that in the near future restrictive measures embracing other groups will be issued.

Such a mass of incontrovertible evidence as to the dangers incident to the use of the public drinking cup or glass has been presented, longer to ignore its menace to health would be little less than criminal. Many states have already established laws and regulations prohibiting the providing of a common drinking cup in schools, railway coaches, and other public places. Among such states may be mentioned Vermont, Massachusetts, Kansas, Michigan, Oklahoma, Wisconsin, Oregon, Utah, Mississippi, South Dakota, Idaho, Louisiana, and perhaps others. It is also prohibited in some municipalities, including the city of New York.

Many bacteriological examinations of common drinking cups have been made, all of which have shown more or less dangerous conditions. An examination of the public drinking cups of the city of Chicago was made by the city bacteriologists. The cups were taken from schoolrooms, railway stations, and other public places, and they revealed a variety of germs, the most frequent being pus germs, with occasional pneumonia and diphtheria bacilli. Guinea pigs were inoculated with these germs, with fatal results, thus proving their viability.

Doctor McCannel, surgeon to the "Soo" Lines, made a series of examinations of the glasses taken from railway coaches, and his report shows that without exception disease producing germs were found, among them being streptococci, staphylococci, pneumococci, tubercle bacilli, colon bacilli, a germ resembling diphtheria bacilli, and immense numbers of epithelial cells. He concludes his exhaustive report with the remark that all experiments made have shown the public drinking cup to be a great menace to health, and that there is not an argument in its favor that could not with equal propriety be used in favor of the public toothbrush or handkerchief.

Recognized authorities are of the opinion that practically all of the communicable diseases may be distributed through the common drinking cup, and it has been demonstrated that in some instances the common drinking cup was the direct source of infection. The germs of tuberculosis, pneumonia, diphtheria, tonsilitis, etc., have been positively identified on the common drinking cup, and there is no reason to believe that the contagion of other diseases, like typhoid fever, scarlet fever, influenza, infantile paralysis, mumps, whooping-cough, measles, etc., may not be present.

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Board of Commissioners of Lunacy.

The State Board of Health constitutes, under the law, a State Board of Lunacy, with authority to investigate the financial condition of alleged indigent insane persons, and to transfer such as, under the law, are entitled to state aid, to the New Hampshire State Hospital.

It also has authority to cause the removal of the insane at the several county almshouses, to the state institution. It has already issued orders, in compliance with an act of the Legislature, directing the several boards of county commissioners to commit all cases of the indigent insane to the New Hampshire State Hospital on and after January 1, 1913.

The board is also required to look into the care and treatment of the insane; to keep a record of all commitments, discharges, and deaths at asylums for the insane, with age and nationality, and to make a report of the same to the governor and council.

A special report of the commission will be printed and distributed the same as other state reports.

In this connection it may be of interest to state that there were, at the close of the present fiscal year 106 so-called insane persons at the county asylums, while there were 957 patients at the State Hospital.

Upon the completion of the buildings now in course of construction and which will be ready for occupancy in a short time, all of the county insane will be transferred to the State Hospital. The records of all cases, whether committed to the county asylums or to the State Hospital, are on file at the office of the State Board of Health.

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WATER SUPPLIES OF TOWNS AND CITIES.

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EXAMINATION OF WATER SUPPLIES.

By Charles D. Howard, *Chemist.*

Dr. Irving A. Watson, Secretary, State Board of Health:

Dear Sir: The following tabulated matter represents the work of the laboratory in the examination of water supplies for the biennial period ending August 31, 1912.

During this period a total of 2,089 samples of water has been examined. These may be classified as follows: Samples representing public (town or city) supplies, 445; semi-public supplies (inclusive of those of schools, industrial establishments, hotels, etc.), 423; from private or individual sources, 1,221.

As a whole, the public water supplies of New Hampshire may be said to be of exceptional excellence. While all of the larger and more important ones require constant watching and supervision, yet there are but very few of polluted or distinctly inferior character, and these are all relatively small supplies. In most instances, such consist of wells or springs, the water of which contains excessive amounts of nitrates and chlorides but with practically no active organic or bacterial pollution. Though in many cases, danger of infection from such source is undoubtedly somewhat remote, because of effective natural soil filtration and the character of the contaminative agency, yet this is by no means the rule. And in no case should a community be satisfied with such a water supply; even though reasonably "safe," so far as probability of typhoid infection is concerned, yet a hard water is not only objectionable for both domestic and industrial purposes, but also in certain cases of invalidism, water of this character containing excessive nitrates is to be avoided.

An excellent example of the danger attending the use of water of the character referred to is to be found in the case of a well constituting a portion of the supply of the town of Durham. A description of the typhoid epidemic resulting is given elsewhere.

Following the tables are a number of special reports relative to certain of the supplies. There is also included a report of the continued investigation of the character of the summer resort water supplies.

The demand for examination of private supplies is still increasing. Notwithstanding the conditions now being exacted, the record shows, in

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place of the decrease anticipated, an actual increase in the number of such examinations over that for the preceding period. While such work may be good policy and of sufficient value to the public to be worth doing, yet its performance with the present force means the more or less serious curtailment of other lines of inspection work. Very many of these private supply examinations might be avoided were the owners to observe the simple precautions requisite for the maintenance of proper quality. There is nothing particularly atypical in a recent case coming to our attention, in which, following a report of pollution, a dead snake was discovered in the well.

Thus of the 1221 private supply samples examined, 42.5 per cent. were found to represent pure water in every respect; these, with 13.7 per cent. found to be pure but for excess of lead, make a total of organic purity amounting to 56.2 per cent. of the 21.6 per cent. representing samples classed as "doubtful or inferior," no small proportion might have been included in the organically pure class, had the wells and springs been subjected to proper care. The proportion of samples showing evidence of advanced pollution is 22.2 per cent.

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Summary of Examinations, 1910–1912, by Towns.

Town.	Total Public Examinations.	Total Semi-Public Examinations.	Total Private Examinations.	Private Supply Data.				Total Lead Tests.	Total Showing Excessive Lead (0.050+ Parts)	
				Pure.	Pure but for Excessive Lead.	Doubtful or Inferior.	Polluted.		Private Supplies.	Public and Semi-Public Supplies.
Acworth	0	1	7	3	3	1	0	7	3	0
Alstead	2	1	16	4	4	3	5	12	4	2
Alton	3	1	3	0	0	1	1	3	0	0
Amherst	7	1	5	3	0	1	1	3	0	0
Andover	4	3	42	19	7	9	7	12	8	1
Antrim	4	0	15	6	1	2	6	11	2	0
Ashland	2	3	6	2	1	2	1	4	1	0
Atkinson	0	1	0	0	0	0	0	0	0	0
Auburn	0	8	3	0	1	0	2	5	1	2
Barnstead	0	2	9	4	0	2	3	4	0	0
Bartlett	2	0	1	0	0	1	0	0	0	0
Bath	2	0	0	0	0	0	0	0	0	0
Bedford	0	0	3	0	1	1	1	1	1	0
Belmont	2	1	2	2	0	0	0	1	0	0
Bennington	2	0	2	2	0	0	0	0	0	0
Berlin	10	6	3	1	0	1	1	1	0	0
Bethlehem	2	2	0	0	0	0	0	1	0	0
Boscawen	3	0	0	0	0	0	0	0	0	0
Bow	0	2	2	1	0	0	2	1	0	0
Bradford	0	11	13	5	4	3	1	17	5	4
Bridgewater	0	1	0	0	0	0	0	0	0	0
Bristol	2	6	12	7	2	3	0	11	2	0
Brookfield	0	0	1	0	0	0	1	0	0	0
Brookline	0	0	5	3	0	1	1	4	1	0
Canaan	2	5	6	2	0	2	2	2	0	0
Campton	0	3	4	1	0	3	0	2	0	1
Candia	2	0	8	1	0	4	3	2	0	0
Canterbury	0	6	3	2	0	1	0	5	0	1
Carroll	0	6	0	0	0	0	0	2	0	0
Center Harbor	0	20	7	4	0	2	1	2	0	1
Charlestown	7	1	15	8	2	2	3	10	2	0

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Summary of Examinations, 1910–1912, by Towns.—Continued.

Town.	Total Public Examinations.	Total Semi-Public Examinations.	Total Private Examinations.	Private Supply Data.				Total Lead Tests.	Total Showing Excessive Lead (0.050+ Parts)	
				Pure.	Pure but for Excessive Lead.	Doubtful or Inferior.	Polluted.		Private Supplies.	Public and Semi-Public Supplies.
Chester	0	8	5	1	0	2	2	3	0	0
Chesterfield	0	0	2	1	0	0	1	1	1	0
Claremont	9	2	5	4	0	0	1	2	0	0
Chichester	0	0	5	1	1	2	1	2	1	0
Colebrook	2	0	0	0	0	0	0	0	0	0
Columbia	0	0	2	0	1	0	1	1	1	0
Concord	11	6	57	23	4	12	18†	21	5	0
Conway	5	2	11	8	0	3	0	3	0	0
Cornish	0	2	2	1	0	1	0	1	0	0
Croydon	0	6	0	0	0	0	0	5	0	3
Danbury	0	5	8	2	3	3	0	5	4	0
Danville	0	0	2	0	0	1	1	1	0	0
Derry	2	6	4	0	0	1	3	1	0	0
Deerfield	0	0	1	0	0	0	1	0	0	0
Dover	15	3	12	7	0	3	2	1	0	0
Dublin	0	1	2	2	0	0	0	1	0	0
Durham	7	9	4	2	0	0	2	1	0	0
Dunbarton	0	0	3	3	0	0	0	3	0	0
Eaton	0	0	1	0	1	0	0	1	1	0
Effingham	0	0	1	0	0	1	0	0	0	0
Elkins	0	2	3	1	0	1	1	4	0	1
Enfield	4	6	5	3	0	2	0	5	0	1
Epping	1	2	6	1	0	2	3*	0	0	0
Epsom	0	2	3	0	1	2	0	3	3	0
Exeter	2	3	7	4	0	0	3	0	0	0
Farmington	15	2	5	0	0	4	1	1	0	0
Francestown	2	1	13	2	1	3	7	3	1	1
Fitzwilliam	0	5	21	7	1	4	9	8	2	0
Franklin	7	3	31	12	7	6	6	21	8	3
Franconia	2	5	3	2	0	0	1	2	0	0
Freedom	1	0	47	37	10‡	0	0	47	10	0

*Including one well maliciously polluted with creosote.
†Including one spring maliciously polluted with Paris Green.
‡ Examined for lead only.

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Summary of Examinations, 1910–1912, by Towns.—Continued.

Town.	Total Public Examinations.	Total Semi-Public Examinations.	Total Private Examinations.	Private Supply Data.				Total Lead Tests.	Total Showing Excessive Lead (0.050+ Parts)	
				Pure.	Pure but for Excessive Lead.	Doubtful or Inferior.	Polluted.		Private Supplies.	Public and Semi-Public Supplies.
Fremont	0	0	1	0	0	1	0	0	0	0
Gilmanton	0	0	3	1	0	1	1	0	0	0
Gilsum	0	0	2	0	0	1	1	1	0	0
Goffstown	2	1	6	4	1	0	1	3	1	0
Gorham	3	0	0	0	0	0	0	0	0	0
Goshen	0	0	5	2	3	0	0	4	3	0
Grafton	0	0	3	3	0	0	0	2	0	0
Grantham	0	4	2	1	1	0	0	6	1	3
Greenfield	0	1	2	1	0	1	0	1	0	0
Greenland	0	0	5	4	0	0	1	0	0	0
Greenville	4	1	9	1	1	4	3	6	4	0
Groton	0	0	1	0	1	0	0	1	1	0
Hampstead	0	1	2	0	0	0	2	1	0	0
Hampton	4	0	2	0	0	0	2	0	0	0
Hampton Falls	0	0	2	0	0	0	2	0	0	0
Hancock	2	0	3	1	1	1	0	3	1	0
Harrisville	0	0	3	2	1	0	0	2	1	0
Hanover	2	0	0	0	0	0	0	0	0	0
Haverhill	5	2	4	3	0	1	0	6	0	2
Hebron	1	1	0	0	0	0	0	1	0	0
Henniker	2	1	5	3	1	1	0	2	1	0
Hill	2	0	2	1	0	1	0	1	0	0
Hillsborough	4	0	14	7	3	4	0	7	3	0
Hinsdale	0	1	5	1	1	3	0	2	1	0
Holderness	0	0	3	1	0	2	0	1	0	0
Hollis	0	0	3	1	0	1	1	1	0	0
Hooksett	0	4	4	1	0	1	2	3	1	0
Hopkinton	4	8	6	2	0	1	3	4	0	2
Hudson	8	0	10	2	0	3	5	1	0	0
Jackson	0	0	6	3	1	2	0	1	1	0
Jaffrey	3	5	6	3	0	0	3	1	0	0

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Summary of Examinations, 1910–1912, by Towns.—Continued.

Town.	Total Public Examinations.	Total Semi-Public Examinations.	Total Private Examinations.	Private Supply Data.				Total Lead Tests.	Total Showing Excessive Lead (0.050+ Parts)	
				Pure.	Pure but for Excessive Lead.	Doubtful or Inferior.	Polluted.		Private Supplies.	Public and Semi-Public Supplies.
Jefferson	0	10	0	0	0	0	0	0	0	0
Keene	6	1	12	6	1	2	3	5	1	0
Kensington	0	0	2	1	0	0	1	0	0	0
Kinstgon	0	1	8	1	0	1	6	0	0	0
Laconia	56	12	41	17	8	9	7	10	8	0
Lancaster	2	5	3	3	0	0	0	2	0	1
Lebanon	4	5	13	5	7	1	0	9	7	0
Lee	0	0	1	0	0	1	0	0	0	0
Lempster	0	0	7	5	0	1	1	5	0	0
Lincoln	2	0	0	0	0	0	0	0	0	0
Lisbon	4	8	17	7	1	5	4	12	2	2
Littleton	2	3	5	5	0	0	0	5	0	1
Londonderry	0	7	5	0	0	0	5	6	3	1
Loudon	0	0	4	2	0	0	2	1	0	0
Lyme	2	1	0	0	0	0	0	2	0	0
Lyndeborough	0	0	10	3	4	1	2	7	5	0
Madbury	0	1	4	0	0	1	3	0	0	0
Madison	2	4	1	0	1	0	0	1	1	0
Manchester	8	10	16	6	0	4	6	11	2	3
Marlboro	0	4	26	12	7	3	4	21	11	1
Marlow	0	0	2	0	2	0	0	2	2	0
Meredith	5	3	6	5	0	1	0	4	0	0
Merrimack	0	2	1	0	0	1	0	0	0	0
Milan	0	0	3	4	0	0	0	4	0	0
Milford	2	0	9	4	0	3	2	5	1	0
Milton	0	0	3	2	1	0	0	1	1	0
Monroe	0	0	2	2	0	0	0	2	0	0
Mont Vernon	0	0	6	1	1	1	3	3	2	0
Moultonborough	0	0	1	1	0	0	0	0	0	0
Nashua	2	3	5	4	0	1	0	1	0	0
Nelson	0	0	2	1	0	1	0	1	0	0

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Summary of Examinations, 1910–1912, by Towns.—Continued.

Town.	Total public examinations.	Total Semi-Public Examinations.	Total Private Examinations.	Private Supply Data.				Total Lead Tests.	Total Showing Excessive Lead (0.050+ Parts)	
				Pure.	Pure but for Excessive Lead.	Doubtful or Inferior.	Polluted.		Private Supplies.	Public and Semi-Public Supplies.
New Boston	0	0	2	0	1	1	0	2	2	0
Newbury	0	0	9	8	0	1	0	3	0	0
Newcastle	0	2	4	1	0	2	1	0	0	0
New Durham	0	0	1	1	0	0	0	0	0	0
Newfields	0	1	1	1	0	0	0	0	0	0
New Hampton	2	0	0	0	0	0	0	0	0	0
New Ipswich	0	1	6	3	2	1	0	6	3	0
New London	3	1	5	4	0	0	1*	2	0	1
Newmarket	2	0	2	2	0	0	0	0	0	0
Newport	3	1	16	8	2	3	3	11	4	0
Newton	0	0	7	2	0	0	†	1	1	0
North Hampton	0	0	7	4	0	2	1	0	0	0
Northumberland	2	0	0	0	0	0	0	0	0	0
Northwood	0	1	6	3	0	2	1‡	4	1	0
Nottingham	0	1	2	1	0	1	0	0	0	0
Orford	1	0	3	0	1	2	0	1	1	0
Ossipee	2	5	7	4	2	1	0	2	2	0
Pelham	0	0	1	0	0	1	0	0	0	0
Pembroke	20	12	25	8	2	7	8	15	4	0
Peterborough	5	1	25	11	6	3	5	14	6	0
Pittsfield	2	0	3	2	0	1	0	1	0	0
Plainfield	3	0	2	2	0	0	0	0	0	0
Plaistow	1	0	....	0	0	0	0	0	0	0
Plymouth	5	4	14	7	4	1	2	7	4	0
Portsmouth	7	0	5	2	0	1	2	1	0	0
Raymond	3	0	1	0	1	0	0	0	0	0
Richmond	0	1	0	0	0	0	0	0	0	0
Rindge	0	2	19	5	3	4	7	4	3	0
Rochester	12	2	16	6	3	2	5	12	6	0
Rollinsford	1	0	1	0	0	0	1	0	0	0
Rumney	0	2	4	1	1	2	0	3	2	1

* Contained 0.8 parts zinc.
† Including one well maliciously polluted with creosote.
‡ Including one well maliciously polluted with lead arsenate.

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Summary of Examinations, 1910–1912, by Towns.—Continued.

Town.	Total Public Examinations.	Total Semi-Public Examinations.	Total Private Examinations.	Private Supply Data.				Total Lead Tests.	Total Showing Excessive Lead (0.050+ Parts)	
				Pure.	Pure but for Excessive Lead.	Doubtful or Inferior.	Polluted.		Public Supplies.	Public and Semi-Public Supplies.
Randolph	0	3	0	0	0	0	0	0	0	0
Rye	0	3*	3	1	0	2	0	0	0	0
Salem	5	0	3	0	0	2	1	0	0	0
Salisbury	0	0	3	1	1	1	0	2	1	0
Sandown	0	0	3	2	0	0	1	1	1	0
Sandwich	0	2	1	0	0	0	1	0	0	0
Seabrook	0	0	1	0	0	0	1	0	0	0
Somersworth	2	1	2	1	0	1	0	0	0	0
Stark	0	3	0	0	0	0	0	0	0	0
South Hampton	0	0	1	0	0	0	1	0	0	0
Springfield	0	0	2	1	0	1	0	0	0	0
Stewartstown	2	0	0	0	0	0	0	0	0	0
Stratford	2	2	0	0	0	0	0	1	1	0
Stoddard	0	0	1	0	0	1	0	1	0	0
Strafford	0	0	1	0	1	0	0	1	1	0
Stratham	0	0	8	5	0	1	2	0	0	0
Sunapee	3	0	9	4	0	2	3	2	0	0
Sullivan	0	1	0	0	0	0	0	1	0	0
Sutton	1	0	2	0	0	1	1	2	0	0
Swanzey	3	4	3	3	0	1	0	3	0	0
Tamworth	0	10	3	2	0	1	0	0	0	0
Temple	0	1	0	0	0	0	0	1	0	0
Thornton	0	3	0	0	0	0	0	2	0	2
Tilton	3	2	16	2	1	8	5	8	1	0
Troy	0	7	15	5	0	7	3	9	1	3
Tuftonborough	0	1	1	1	0	0	0	0	0	0
Unity	0	1	2	1	0	0	1	1	0	0
Wakefield	5	1	22	9	0	3	10	8	1	0
Walpole	7	0	5	2	0	2	2	1	5	0
Warner	4	9	20	4	6	9	1	19	5	0
Warren	0	5	17	6	6	3	2	16	8	2

* Including one spring water sold under a deceptive label.

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Summary of Examinations, 1910–1912, by Towns.—Continued.

Town.	Total Public Examinations.	Total Semi-Public Examinations.	Total Private Examinations.	Private Supply Data.				Total Lead Tests.	Total Showing Excessive Lead (0.050+ Part[s])	
				Pure.	Pure but for Excessive Lead.	Doubtful or Inferior.	Polluted.		Private Supplies.	Public and Semi-Public Supplies.
Washington	0	0	1	0	1	0	0	1	1	0
Weare	0	2	7	4	1	1	1	2	2	0
Webster	0	1	5	0	1	1	3	1	1	0
Wentworth	0	5	9	3	4	2	0	11	4	3
Westmoreland	0	0	1	0	0	0	1	0	0	0
Whitefield	2	5	10	7	0	1	2	3	0	1
Wilmot	0	3	5	0	2	2	1	5	2	0
Wilton	6	1	28	12	10	4	2	22	11	0
Winchester	0	5	7	2	1	0	4	9	2	0
Windham	0	0	2	1	0	0	1	0	0	0
Wolfeboro	3	2	5	2	0	3	0	0	0	0
Woodstock	2	6	5	3	0	2	0	0	0	0
Totals	445	423	1,221	519	167	264	271	677	214	50

Total samples examined 2,089.

Allenstown.—(See Pembroke for analyses of public supply.)

Acworth.

Examination of Water from Spring of George R. Cummings.

Number.	Date of collection.	Appearance				Residue on Evapo'n		Ammonia		Nitrogen as		Chlorine.	Hardness.	Lead.
		Turbidity.	Sediment.	Odor.	Color.	Total.	Fixed.	Free.	Albuminoid	Nitrates.	Nitrites.			
9485	1911 Oct.15	None	None	None	0.00	.....	....	.0010	.0010	.0100	.0000	.15	.503	0000

Alstead.—A gravity supply inaugurated by the town in 1911, is derived from springs. Watershed of 125 acres, uninhabited. The system includes one-third mile of distributing mains, with lead services, and supplies about twenty families. Another spring supply furnishes water for a public watering trough and several houses. This is also

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conducted through lead pipe and water has been found dangerous on this account.

Examination of Water from Supply of Alstead.

Number.	Date of collection.	Appearance				Residue on Evapo'n		Ammonia		Nitrogen as		Chlorine.	Hardness.	Lead.	
		Turbidity.	Sediment.	Odor.	Color.	Total.	Fixed.	Free.	Albuminoid	Nitrates.	Nitrites.				
9817	Apr. 11	None	V. slight	None	0.05	.....	....	.0005	.0015	.0025	.0000	.03	.30	.070	..
9877	Apr. 30	None	None	None	.05	.....	....	.0010	.0015	.0025	.0000	.03	.90	.060	..

Examination of Water from Spring of R. B. Carter.

8396	1910 Sept. 2	None	S. earthy	S.musty	0.05	.....	....	.0036	.0026	.0020	.0012	.12	4.4	....	..

Sixteen samples representing private sources were classified as four pure, four pure but for lead, three questionable and five polluted. Of twelve lead examinations, six showed excessive amounts.

Alton.—The Alton & Alton Bay Water Works Company, established in 1892–93, supplies about 100 families (90 per cent. of the population), with water from a spring, except in dry weather, when it is pumped from Lake Winnipesaukee to a reservoir of 150,000 gallons' capacity.

Examination of Water from Faucet of Supply of Alton & Alton Bay Water Company.

Number.	Date of collection.	Appearance				Residue on Evapo'n		Ammonia		Nitrogen as		Chlorine.	Hardness.	Lead.	
		Turbidity.	Sediment.	Odor.	Color.	Total.	Fixed.	Free.	Albuminoid	Nitrates.	Nitrites.				
5167	1908 Mar.13	None	None	S. earthy	0.00	5.0	3.0	.0004	.0040	.0050	.0000	.21	2.6	....	..
5831	Nov.11	None	None	Earthy	0.00	4.0	2.7	.0030	.0055	.0070	.0002	.12	1.5	....	..
7519	1909 Dec. 24	.....	.....	.....	....	.....	....	.....	.....	.....	.....	....	....	....	*
7522	Nov.19	None	None	Earthy	0.20	4.5	2.5	.0002	.0030	.0100	.0000	.15	1.9	....	*
7709	1910 Mar.10	None	None	S. earthy	0.00	4.8	2.4	.0004	.0010	.0050	.0000	.19	1.9	....	..

* B. Coli present.

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Examination from Alton.—Continued.

Number.	Date of collection.	Appearance				Residue on Evapo'n		Ammonia		Nitrogen as		Chlorine.	Hardness.	Lead.	
		Turbidity.	Sediment.	Odor.	Color.	Total.	Fixed.	Free.	Albuminoid	Nitrates.	Nitrites.				
8788	1911 Apr. 3	None	None	None	0.10	5.2	2.9	.0035	.0040	.0050	.0000	.17	2.0	....	..
9011	June 19	None	None	Sl. earth	0.08	.....	....	.0010	.0020	.0050	.0000	.15	1.4	....	*
9825	1912 Apr. 15	V. slight	V. slight	None	0.18	4.0	2.5	.0010	.0050	.0025	.0000	.14	1.1	....	..

* B. Coli present.

Examination of Water from Spring of Frank I. Allen.

8756	1911 Mar. 20	V. slight	V. slight	None	.05	.....	....	.0060	.0040	.0025	.0000	.08	1.2	....	..

Amherst.—There are four spring supplies of public character, serving a small proportion of the village population with running water. A movement was inaugurated during 1911 for a town supply but this has not as yet been consummated. (See special report elsewhere.)

Examination of Water from Brook Flowing into Souhegan River, proposed Public Supply.

Number.	Date of collection.	Appearance				Residue on Evapo'n		Ammonia		Nitrogen as		Chlorine.	Hardness.	Lead.	
		Turbidity.	Sediment.	Odor.	Color.	Total.	Fixed.	Free.	Albuminoid	Nitrates.	Nitrites.				
9812	1912 Apr. 11	V. slight	Sl. floc.	Earthy	0.23	5.5	4.0	.0015	.0055	.0030	.0000	.40	0.7	....	*[1]
9813	Apr. 11	None	V. slight	Slight	0.20	3.3	1.8	.0010	.0025	.0030	.0000	.20	0.4	....	[2]
9839	Apr. 16	.....	.....	.....	....	....	....	.....	.....	.....	.....	....	....	....	*[1]
9840	Apr. 16	.....	.....	.....	....	....	....	.....	.....	.....	.....	....	....	....	*[1]

* B. Coli present.
[1] Above roadway leading into Mont Vernon village.
[2] Just below proposed dam.

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Examination of Water from Spring Supply of Abby Melendy.

Number.	Date of collection.	Appearance				Residue on Evapo'n		Ammonia		Nitrogen as		Chlorine.	Hardness.	Lead.	
		Turbidity.	Sediment.	Odor.	Color.	Total.	Fixed.	Free.	Albuminoid	Nitrates.	Nitrites.				
3093	1905 Aug. 17	None	Slight	S. earthy	0.00	5.5	3.7	.0000	.0000	.0100	.0000	.15	1.5	.070	..
3504	1906 Mar. 6	None	None	V.slight	0.00	4.5	3.8	.0008	.0044	.0100	.0000	.20	1.1	....	..
4910	1907 Oct. 30	None	None	Foul	0.00	3.7	3.2	.0014	.0026	.0050	.0000	.17	1.2	.090	..
8804	1911 Apr. 24	None	None	None	0.00	3.1	1.6	.0010	.0010	.1000	.0000	.20	.40	.037	..

Examination of Water from Spring Supply of Elizabeth Nichols.

3085	1905 Aug. 15	None	None	None	0.00	5.8	3.0	.0006	.0008	.0000	.0000	.05	1.8	.010	..
3326	Dec. 6	None	None	None	0.20	6.5	3.9	.0010	.0066	.0050	.0000	.29	0.6	....	..
8561	1910 Nov.29	Mod. opal	None	Sl. veg.	0.10	.....	....	.0030	.0045	.0750	.0000	.30	3.9	.012	..
9641	1911 Dec. 21	Mod. opal	None	Sl. earthy	0.25	.....	....	.0010	.0010	.0025	.0000	.20	1.9	.000	..

Examination of Water from Well of Louis E. Clark.

9662	1912 Jan. 2	V.slight	Sl. grey floc.	Sl. foul	0.00	.....	....	.0006	.0010	.0050	Ft.tr.	.45	2.6	....	..

Andover.—During 1910 the Andover Village Fire District installed a gravity system from a pond fed by a brook and augmented in area through the erection of a dam. The recently flowed area nearest the latter is shallow and the bottom somewhat muddy and covered with decomposing vegetation. Shores mainly wooded, with five or six summer cottages and two dwellings contiguous to the pond. There are two and one-half miles of cast iron mains; wrought iron service pipes. About 90 per cent. of the population supplied, in addition to three school dormitories, academy, church and one factory. The spring supply of C. E. Carr, partly through lead, furnishes the store and three families.

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Examination of Water Supplied Andover Center.

Number.	Date of collection.	Appearance				Residue on Evapo'n		Ammonia		Nitrogen as		Chlorine.	Hardness.	Lead.	
		Turbidity.	Sediment.	Odor.	Color.	Total.	Fixed.	Free.	Albuminoid	Nitrates.	Nitrites.				
7833	1910 Apr. 25	None	S. hair like	None	1.05	3.5	2.1	.0007	.0050	.0050	.0000	.12	1.5	.005	..
7953	June 9	None	None	S. earthy	0.00	2.4	2.0	.0030	.0010	.0025	.0000	.04	1.2	.025	..
7970	June 16	None	None	None	0.00	3.0	2.0	.0010	.0010	.0050	.0000	.05	1.2	.012	..
7971	June 16	None	None	None	0.00	3.3	2.3	.0010	.0020	.0025	.0000	.04	1.2	.012	..
7972	June 16	None	None	None	0.05	2.1	1.8	.0020	.0010	.0025	.0000	.04	1.2	.012	..
8747	1911 Mar.17	None	None	Sl. earth	0.00	5.3	3.3	.0024	.0040	.0040	.0000	.10	2.6	....	..
8749	Mar.17	None	V. slight	None	0.00	.....	....	.0002	.0004	.0040	.0000	.17	2.6	....	..
8784	1911 Apr. 11	Sl. opal	Sl. floc.	Sl. arom	0.35	4.5	2.2	.0055	.0040	.0050	.0000	.05	1.2	....	..
9829	1912 Apr. 16	V.sl. opal	V. slight	Ft. earthy	0.25	3.5	2.3	.0100	.0025	.0050	.0000	.10	1.2	....	..

Examination of Water from Reservoir of the Boston & Maine Railroad.

9272	1911 Aug. 15	None	V. slight	None	0.05	.....	....	.0010	.0010	.0025	.0000	.05	1.5	High	..

Examination of Water from Highland Lake.

8978	1911 June 11	Slight	Fibrous	Earthy	0.15	12.7	1.5	.0025	.0100	.0050	.0000	.07	0.6	....	..

Of forty-two samples representing private sources examined, nineteen were classified as pure, seven pure but for lead, nine doubtful and seven polluted. Of the twelve lead examinations made nine indicated excessive amounts.

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Antrim.—A water supply was installed by the town in 1893, the source being a pond of about 16 acres in area, and of an average depth of sixteen feet. It is a gravity system, employing three miles of pipe, wooden main, and iron service pipes. Ninety per cent. of the population take this water.

Examination of Water from Tap of Town Supply.

Number.	Date of collection.	Appearance				Residue on Evapo'n		Ammonia		Nitrogen as		Chlorine.	Hardness.	Lead.	
		Turbidity.	Sediment.	Odor.	Color.	Total.	Fixed.	Free.	Albuminoid	Nitrates.	Nitrites.				
5168	1908 Mar.13	None	None	None	0.10	3.0	1.4	.0150	.0060	.0060	.0000	.26	0.4	....	..
5700	Oct. 28	Marked	Consid.	Putrid	V.cl-ou-dy	....	....	Very high	Very high	.0030	.0000	1.10	1.9	....	*
5704	Oct. 29	Marked	Consid.	Putrid	Cl-ou-dy	....	....	Very high	Very high	.0050	.0000	1.10	1.2	....	*
5772	Oct. 20	V. S.	None	None	0.15	1.9	.2	.0035	.0050	.0000	.0000	.10	.2	....	..
5805	Oct. 28	V. S.	None	Earthy	0.10	1.7	.6	.0010	.0100	.0000	.0000	.08	.4	....	..
6016	1909 Mar. 3	None	None	None	0.10	2.2	1.1	.0140	.0100	.0100	.0000	.11	.4	....	..
7711	1910 Mar.11	None	None	None	0.05	3.9	1.6	High	.0070	.0100	.0000	.20	.7	....	..
8781	1911 Apr. 11	Slight	V. slight	Earthy	0.25	3.3	1.6	.0180	.0050	.0050	.0000	.10	.7	....	..
9675	1912 Jan. 9	Slight	V. slight	Marshy	0.05	2.5	0.9	.0010	.0065	.0025	.0000	.12	.4	....	..
9683	Jan. 15	None	V. slight	Marshy	0.05	2.8	1.9	.0010	.0045	.0025	.0000	.12	.3	....	..
9823	Apr. 15	V.sl. opal	None	Sl. earthy	0.08	3.5	1.5	.0010	.0025	.0050	.0000	.12	.4	....	..

* B. coli present.

Of sixteen samples representing private sources, six proved to be sewage polluted.

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Ashland.—The town operates a public water supply derived from a pond.

Examination of Water from Tap of Town Supply.

Number.	Date of collection.	Appearance				Residue on Evapo'n		Ammonia		Nitrogen as		Chlorine.	Hardness.	Lead.	
		Turbidity.	Sediment.	Odor.	Color.	Total.	Fixed.	Free.	Albuminoid	Nitrates.	Nitrites.				
	1908														
5138	Feb. 19	None	None	Sl. woody	0.20	3.7	2.3	.0012	.0076	.0100	.0000	.25	1.2	....	..
5175	Mar.18	None	None	Sl. earthy	0.20	1.7	1.0	.0004	.0048	.0060	.0000	.19	0.4	....	..
5847	Nov.18	None	None	S. earthy	0.10	2.9	1.3	.0020	.0050	.0000	.0000	.08	.4	....	..
	1910														
7716	Mar.15	None	None	S. earthy	0.05	3.1	1.6	.0008	.0078	.0020	.0000	.17	.9	....	..
	1911														
8786	Apr. 11	V. slight	None	None	0.20	4.6	2.6	.0010	.0060	.0100	.0000	.15	.9	....	..
	1912														
9828	Apr. 15	Sl. opal	None	Ft. earthy	0.15	2.5	1.5	.0015	.0035	.0050	.0000	0.08	.4	....	..

Examination of Water from Harvard Camp.

	1910														
8211	July 27	None	None	None	0.05	.....	....	.0005	.0005	.0050	.0000	.05	2.6	....	[1]
8215	July 27	Slight	Mod. ferrug	Mark'd veg.	0.20	.....	....	.0030	.0070	.0050	.0000	.40	2.6	....	[2]
	1911														
9330	Aug. 23	None	None	Sl. earthy	0.00	.....	....	.0010	.0015	.0025	.0000	.05	3.7	....	..
9333	Aug. 23	V. slight	V. slight	None	0.05	.....	....	.0005	.0010	.0025	.0000	.07	3.2	....	*[1]

* B. coli present.
[1] Spring.
[2] Pumping station.

Atkinson.

Examination of Water from Spring of Granite State Spring Water Company.

Number.	Date of collection.	Appearance				Residue on Evapo'n		Ammonia		Nitrogen as		Chlorine.	Hardness.	Lead.	
		Turbidity.	Sediment.	Odor.	Color.	Total.	Fixed.	Free.	Albuminoid	Nitrates.	Nitrites.				
	1911														
9282	Aug. 22	None	V. sl. gelat.	None	None	5.5	3.5	.0005	.0010	.0025	.0000	.40	.70	....	..

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Barnstead.

Examination of Water from Well of J. A. Jenness.

Number.	Date of collection.	Appearance				Residue on Evapo'n		Ammonia		Nitrogen as		Chlorine.	Hardness.	Lead.	
		Turbidity.	Sediment.	Odor.	Color.	Total.	Fixed.	Free.	Albuminoid	Nitrates.	Nitrites.				
9082	1911 July 12	None	V. slight	Foul	0.00	.....	....	V. high	V. high	.0200	V. high	1.0	6.0	.037	..

Examination of Water from the Well of Charles Hartwell.

9276	1911 Aug. 16	None	Sl. gelat.	Foul	0.00	.....	....	.0050	.0030	.0050	Trace	.20	1.2	....	..

Of nine samples from private sources, four were found to represent good water, five doubtful or polluted.

Bartlett.—The public water supply, owned by the village precinct, was installed about the year 1888 by the Bartlett Water Company. The source is a stream having a watershed of two square miles, wooded land, no inhabitants.

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Examination of Water from Tap of Bartlett Water Company.

Number.	Date of collection.	Appearance				Residue on Evapo'n		Ammonia		Nitrogen as		Chlorine.	Hardness.	Lead.	
		Turbidity.	Sediment.	Odor.	Color.	Total.	Fixed.	Free.	Albuminoid	Nitrates.	Nitrites.				
5201	1908 Apr. 1	None	V. slight	Earthy	0.05	3.7	1.5	.0002	.0018	.0200	.0000	.11	0.4	....	..
5428	July 20	None	Consid. floc.	Earthy	0.05	3.3	2.5	.0014	.0026	.0100	.0000	.07	0.4	....	[1]
5429	July 20	V. slight	Consid. floc.	S. earthy	0.05	2.8	2.0	.0012	.0008	.0080	.0000	.08	0.4	....	*[2]
5836	Nov.13	None	Slight	None	0.20	1.9	1:2	.0005	.0010	.0000	.0000	.06	.10	....	..
7733	1910 Mar.17	None	None	None	0.20	2.5	1.3	.0006	.0036	.0060	.0000	.10	.30	....	..
8790	1911 Apr. 14	None	None	None	None	3.3	1.8	.0010	.0020	.0050	.0000	.08	.30	....	..
9851	1912 Apr. 22	V. slight	Sl. veg.	Ft. earthy	0.23	3.8	2.0	.0005	.0025	.0050	.0000	.09	.30	....	..

* B. coli present.
[1] South Branch, Albany Brook.
[2] East Branch, Albany Brook.

Bath.—Water is supplied by two private companies, from springs, dug in a clay soil. The water runs by force of gravity, with about two miles of iron main and service pipes. There are 12 or 15 wells within the area supplied.

Examination of Water from Faucet of Bath Aqueduct Company.

Number.	Date of collection.	Appearance				Residue on Evapo'n		Ammonia		Nitrogen as		Chlorine.	Hardness.	Lead.	
		Turbidity.	Sediment.	Odor.	Color.	Total.	Fixed.	Free.	Albuminoid	Nitrates.	Nitrites.				
5180	1908 Mar.20	None	None	None	0.05	6.1	3.5	.0010	.0010	.0300	.0000	.29	3.2	....	..
7757	1910 Mar.28	None	None	None	0.05	7.5	4.8	.0010	.0046	.0020	.0000	.16	.4	....	†
8812	1911 Apr. 24	None	V. slight	None	0.05	5.5	3.1	.0010	.0015	.0025	.0000	.15	2.0	....	..
9831	1912 Apr. 17	None	Sl. foul	None	0.03	5.7	4.2	.0005	.0015	.0025	.0000	.07	2.4	....	..

† Trace zinc.

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Belmont.—The Belmont Water Works, owned by the town, were installed in 1893. Water is obtained from a drilled well 200 feet deep, also a number of springs, and this supply is supplemented in dry seasons by a stream. The water is pumped to a reservoir of 6,000 gallons, from which it is distributed through two miles of wooden mains, supplying 125 families. There is also a spring from which ten families are supplied.

Examination of Water from Tap of Belmont Water Company.

Number.	Date of collection.	Appearance				Residue on Evapo'n		Ammonia		Nitrogen as		Chlorine.	Hardness.	Lead.	
		Turbidity.	Sediment.	Odor.	Color.	Total.	Fixed.	Free.	Albuminoid	Nitrates.	Nitrites.				
5189	1908 Mar. 25	Consid.	M. earthy	Slight	0.40	3.0	1.5	.0002	.0114	.0020	.0000	.12	0.4	....	..
5828	No. 5	None	None	None	0.15	2.3	1.3	.0005	.0030	.010	.0000	.11	.9	....	..
7720	1910 May 15	None	None	None	0.00	2.6	2.3	.0004	.0040	.0050	.0000	.19	.9	....	..
8798	1911 Apr. 17	None	None	Sl. earthy	0.00	3.3	1.8	.0020	.0070	.0025	.0000	.20	.9	....	..
9858	1912 Apr. 25	Slight	Sl. floc.	None	0.08	2.8	1.9	.0005	.0015	.0025	.0000	.11	.6	....	..

Examination of Water from Well of A. A. Smith.

9987	1912 June 10	V. slight	Slight	Ft. earthy	5.05	.....	....	.0010	.0020	.1000	High	3.60	8.7	....	..

Bennington.—No public supply. The Bennington Water Works Company, a private company, in 1900 installed a system supplied from springs, with a supplementary supply from a stream.

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Examination of Water from a Faucet of the Bennington Water Works Company.

Number.	Date of collection.	Appearance				Residue on Evapo'n		Ammonia		Nitrogen as		Chlorine.	Hardness.	Lead.	
		Turbidity.	Sediment.	Odor.	Color.	Total.	Fixed.	Free.	Albuminoid	Nitrates.	Nitrites.				
5182	1908 Mar.23	V. slight	Slight	None	0.05	5.7	2.5	.0024	.0018	.0080	.0000	.11	0.4	....	*
5841	Nov.16	None	V. slight	Earthy	0.10	3.8	2.4	.0008	.0015	.0100	.0000	.15	.7	....	..
7139	1909 June 28	S. coarse	S. coarse	None	0.00	.....	.....	.0015	.0015	.0050	.0000	.05	.9	....	..
7746	1910 Mar.22	Slight	Mod. earthy	Earthy	0.10	4.2	1.6	.0014	.0054	.0020	.0000	.41	1.2	....	..
8793	1911 Apr. 17	None	V. slight	Earthy	0.10	3.3	2.0	.0070	.0060	.0050	.0000	.05	.40	....	..
9826	1912 Apr. 14	V. slight	V. slight	None	0.10	3.0	1.7	.0005	.0030	.0025	.0000	.07	.40	....	..

* B. coli present.

Berlin.—There are two private supplies, the Berlin Water Company, established in 1892, and the A.B. Forbush supply (1905). The latter consists of springs dug ten feet deep and supplies about twenty families on the east side of the Androscoggin River. This supply is apt to go dry during the summer.

The Berlin Water Company derives its supply from a stream with a wooded and uninhabited watershed of three and one-half square miles. There are three reservoirs supplied by gravity, known respectively as the Bean Brook (3,000,000 gallons), the Anderson (10,000,000 gallons) and the Stewart (2,500,000 gallons). Twenty-one miles of cast iron distributing pipe with about 1,200 services (galvanized) supplying practically the whole population. During 1909, for use in times of drought, and for increasing the fire protection of the city, the Berlin Water Company installed a two-stage D'Olier pump at the Burgess Sulphite Fibre Company's plant. The water passes through sand filters and is supplied to the filters from the Androscoggin River by a pump of about 1,500 gallons capacity per minute, with eighty pounds pressure.

Quite a number of the inhabitants at Berlin Mills are supplied from wells, the water of which flows to the dwellings by gravity.

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Examination of Water from Berlin Water Company.

Number.	Date of collection.	Appearance				Residue on Evapo'n		Ammonia		Nitrogen as		Chlorine.	Hardness.	Lead.	
		Turbidity.	Sediment.	Odor.	Color.	Total.	Fixed.	Free.	Albuminoid	Nitrates.	Nitrites.				
	1908														
5163	Mar. 9	None	None	None	0.25	3.2	1.3	.0008	.0050	.0250	.0000	.07	1.2	....	..
5234	Apr. 15	V.slight	V. slight	None	0.55	3.7	1.4	.0004	.0054	.0120	.0000	.04	0.4	....	..
5247	Apr. 22	Mod. opal	Heavy earthy	S. earthy	Cloudy	12.0	10.0	0002	.0010	.0040	.0000	.37	1.5	....	..
5678	Sept.23	V.slight	Slight	Earthy	0.05	4.7	2.0	.0002	.0054	.0050	.0000	.08	.4	....	*
5679	Sept.23	V.slight	V. slight	Rank	0.05	5.1	2.6	.0008	.0060	.0060	.0000	.07	.4	....	*
5680	Sept.23	V.slight	Slight	Slight	0.05	5.7	2.8	.0002	.0030	.0060	.0000	.10	.4	....	*
5722	Oct. 5	None	V. slight	None	0.05	5.3	2.4	.0030	.0090	.0050	.0000	.05	.4	....	..
5751	Oct. 13	None	V. slight	Musty	0.25	2.9	2.0	.0018	.0060	.0070	.0000	.15	.3	....	..
5723	Oct. 5	None	Slight	None	0.20	3.0	1.5	.0020	.0730	.0050	.0000	.05	.3	....	*
5724	Oct. 5	None	None	None	0.05	5.0	....	.0008	.0006	.0050	.0000	.16	.9	....	..
5790	Oct. 22	None	None	None	0.25	3.2	1.7	.0002	.0015	.0090	.0000	.12	.9	....	..
5827	Nov. 6	V.slight	None	S. musty	0.35	5.1	3.1	.0010	.0000	.0150	.0000	.09	.7	....	..
	1909														
6034	Mar.16	None	V. slight	S. earthy	0.30	.5	....	.0005	.0030	.0300	.0000	.05	.7	....	..
6069	Mar.31	None	None	None	0.40	4.7	2.3	.0005	.0070	.0200	.0000	.06	1.1	....	..
6070	Mar.31	None	None	None	0.40	4.6	2.5	.0008	.0060	.0200	.0000	.05	.9	....	..
7370	Sept.22	V.slight	V. slight	None	0.20	4.0	2.0	.0010	.0060	.0050	.0000	.08	.6	....	..
7374	Sept.22	Slight	S. floc.	None	0.30	3.8	1.5	.0030	.0100	.0050	.0000	.07	.7	....	..
	1910														
7726	Mar.15	None	None	None	0.40	3.5	1.9	.0004	.0068	.0040	.0000	.14	1.1	....	..
8132	July 15	None	V. slight	None	0.35	.....	....	.0038	.0064	.0050	.0000	.10	1.4	....	..
	1911														
8601	Jan. 3	None	V. slight	Sl. earthy	0.65	4.5	2.4	.0030	.0090	.0100	.0000	.08	1.9	....	..
8783	Apr. 17	Slight	V. slight	None	0.65	4.7	2.2	.0010	.0030	.0050	.0000	.10	1.5	....	..
8931	May 29	V.slight	Slight	Sl. earthy	0.40	3.8	2.3	.0010	.0050	.0100	.0000	.10	1.5	....	..
	1912														
9723	Feb. 6	None	V. slight	None	0.25	3.5	1.7	.0100	.0130	.0050	.0000	.08	0.7	....	..
9724	Feb. 5	Sl. opal	Mod. floc.	Earthy	0.08	5.3	3.3	.0030	.0125	.0200	.0000	.09	1.5	....	..
9793	Mar.28	Mod. opal	Mod. earthy	Mod. earthy	0.35	5.2	2.7	V. high	.0105	.0300	Sl. trace	.25	1.4	....	..
9824	Apr. 22	Slight	Sl. veg.	Sl. veg.	0.40	4.8	2.0	.0060	.0105	.0050	.0000	.10	0.6	....	..
9882	May 1	V.slight	V. slight	V. sl. swampy	0.35	.....	....	.0050	.0070	.0050	.0000	.08	1.4	....	..
10363	Aug. 9	V.slight	V. slight	Sl. swampy	0.45	4.7	3.7	.0010	.0085	.0050	.0000	.08	1.4	....	..
10383	Aug. 14	V.slight	Slight	V. sl. swampy	0.55	.....	....	.0010	.0090	.0050	.0000	.08	1.4	....	..

*B. coli present.

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Examination of Water from Supplies of the Burgess Sulphite Fibre Company.

Number.	Date of collection.	Appearance				Residue on Evapo'n		Ammonia		Nitrogen as		Chlorine.	Hardness.	Lead.	
		Turbidity.	Sediment.	Odor.	Color.	Total.	Fixed.	Free.	Albuminoid	Nitrates.	Nitrites.				
5545	1908 Aug. 21	None	V. slight	Slight	0.40	4.8	1.9	.0004	.0054	.0020	.0000	.15	1.2	....	[1]
1031	1909 Mar.16	None	V. slight	S. earthy	0.30	....	....	.0008	.0036	.0200	.0000	.07	1.8	....	[1]
8597	1910 Dec. 29	None	None	None	0.20	....	....	.0010	.0040	.0050	.0000	.08	1.2	....	[1]
8649	1911 Jan. 5	None	V. slight	Dist. veg.	0.30	4.4	2.4	.0030	.0070	.0050	.0000	.030	0.7	....	[1]
9397	Sept. 6	V. slight	None	None	0.40	....	....	.0004	.0070	.0040	.0000	.18	0.7	....	[1]
5544	1908 Aug. 26	None	None	None	0.05	9.7	6.3	.0006	.0024	.1000	.0000	1.00	3.2	....	[2]
8103	1910 July 9	Slight	S. floc.	None	0.55	....	....	.0036	.0025	.0025	trace	.60	12.4	....	[3]

[1] Filtered Androscoggin River water.
[2] Spring.
[3] Artesian well.

Examination of Water from Spring used by Public.

8458	1910 Sept.29	None	V. slight	None	0.05	.....	....	.0030	.0020	.0750	.0000	.80	2.6	.012	..

Examination of Water from Spring of John McCarroll.

9117	1911 July 17	V.sl. opal	Sl. coarse	None	0.00	.....	....	.0050	.0045	.0750	trace	1.60	4.6	....	*

Examination of Water from the Spring of J. W. Cooper.

9935	1912 May 16	None	V. slight	None	0.05	.....	....	.0010	.0015	.0500	.0000	1.90	4.6	....	*

*B. coli present.

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Bethlehem.—The precinct supply, completed in 1898, is from a stream. The watershed is wooded several miles each side. The water is delivered by gravity through about twelve miles of iron service and main pipes. Ninety-eight per cent. of the population take this water.

Examination of Water Supplied by the Crystal Springs Water Company.

Number.	Date of collection.	Appearance				Residue on Evapo'n		Ammonia		Nitrogen as		Chlorine.	Hardness.	Lead.	
		Turbidity.	Sediment.	Odor.	Color.	Total.	Fixed.	Free.	Albuminoid	Nitrates.	Nitrites.				
5176	1908 Mar.18	None	None	None	0.10	2.3	.8	.0002	.0014	.0100	.0000	.08	0.4	....	..
5832	Nov.11	V. slight	None	None	0.10	2.5	1.5	.0002	.0015	.0100	.0000	.03	0.1	....	..
7728	1910 Mar.16	None	None	None	0.10	3.5	0.7	.0060	.0030	.0050	.0000	.05	.4	....	..
8099	July 6	None	V. slight	None	0.05	.....	....	.0015	.0010	.0025	.0000	.05	.4	....	..
8787	1911 Apr. 12	None	V. slight	Ft. arom.	0.08	2.9	1.6	.0010	.0020	.0025	.0000	.04	0.4	....	..
9830	1912 Apr. 22	V.sl.opal	Sl. veg.	Slight	0.23	3.2	1.8	.0005	.0030	.0025	.0000	.04	0.1	....	..

Examination of Water from Well of John Cole, Jr.

9310	1911 Aug. 17	V. slight	Sl.earthy	Earthy	0.00	.....	....	.0005	.0010	.0025	.0000	.03	1.2	....	..

Boscawen.—Water is from the public supply, Penacook & Boscawen Water Precinct, constructed in 1892. The source is a pond of 340 acres; greatest depth, 36 feet; soil, largely gravel. The water shed is nearly seven square miles, both wooded and cleared. There are five or six houses on the shores of the pond. It is a gravity system, through thirteen miles of wooden and galvanized iron pipe. About two hundred families are supplied.

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Examination of Water from Tap of Penacook & Boscawen Water Supply.

Number.	Date of collection.	Appearance				Residue on Evapo'n		Ammonia		Nitrogen as		Chlorine.	Hardness.	Lead.	
		Turbidity.	Sediment.	Odor.	Color.	Total.	Fixed.	Free.	Albuminoid	Nitrates.	Nitrites.				
5198	1908 Mar.30	None	V. slight	S. veg.	0.40	2.7	1.7	.0002	.0068	.0150	.0000	.20	1.2	....	..
5865	Nov.26	None	None	Earthy	0.20	2.5	1.8	.0001	.0085	.0000	.0000	.07	.4	....	..
7516	1909 Nov.16	None	None	Sl. earthy	0.10	3.0	1.0	.0005	.0090	.0050	.0000	.05	.9	....	..
7744	1910 Mar.22	Mod.	S. fibr.	Swampy	0.20	3.7	2.7	.0004	.0094	.0120	.0000	.22	1.5	....	..
8548	Nov.21	V. slight	V. slight	Slight	0.30	5.0	2.3	.0010	.0080	.0100	.0000	.10	1.2	....	..
8802	1911 Apr. 19	V. slight	Slight	Sl. swampy	0.25	3.5	1.8	.0030	.0080	.0050	.0000	.15	1.2	....	*
9850	1912 Apr. 24	Slight	Slight	Ft. marsh	0.25	3.8	1.5	.0010	.0045	.0050	.0000	.09	0.7	....	*

* B. coli present.

Bow.

Examination of Water from Well of Oscar Dow used as School Supply.

Number.	Date of collection.	Appearance				Residue on Evapo'n		Ammonia		Nitrogen as		Chlorine.	Hardness.	Lead.	
		Turbidity.	Sediment.	Odor.	Color.	Total.	Fixed.	Free.	Albuminoid	Nitrates.	Nitrites.				
9789	1912 Mar.27	None	Slight	None	0.05	.....	....	.0010	.0015	.0100	.0000	.15	1.9	....	..

Bradford.—The results of examination of thirteen samples representing private sources are classified as, five good, four good but for lead, three questionable or poor, and one sewage polluted. Five of the twelve lead examinations showed excess of this metal.

Bristol.—Bristol Aqueduct Company, incorporated in 1886, supplies water from Newfound Lake, the area of which is about nine square miles. The watershed is largely wooded, some cleared land. It is a gravity system, with about six miles of pipe, mostly cement, but some cast iron mains, and galvanized iron, lead and tin-lined service pipes. About three-fourths of the population of the village use the aqueduct

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water, while there are a few wells, mostly located back on the hills, away from buildings.

Examination of Water from a Faucet of the Bristol Aqueduct Company.

Number.	Date of collection.	Appearance				Residue on Evapo'n		Ammonia		Nitrogen as		Chlorine.	Hardness.	Lead.	
		Turbidity.	Sediment.	Odor.	Color.	Total.	Fixed.	Free.	Albuminoid	Nitrates.	Nitrites.				
5174	1908 Mar.16	None	None	S. earthy	0.15	2.9	1.7	.0020	.0030	.0040	.0000	.16	0.4	....	..
5856	Nov.25	None	None	None	0.10	2.6	1.7	.0010	.0030	None	.0003	.08	.4	....	..
7717	1910 Mar.15	None	V. slight	Slightly swampy	0.05	2.5	1.1	.0012	.0060	.0040	.0000	.12	.4	....	..
8795	1911 Apr. 17	None	V. slight	Earthy	0.15	2.6	1.4	.0010	.0020	.0025	.0000	.12	0.4	....	..
9827	1912 Apr. 15	None	None	None	0.10	2.6	.08	.0005	.0045	.0025	.0000	.06	0.4	....	..

Examination of Water from Well of F. L. H. Kerman used by Public.

10340	1912 Aug. 1	None	V. slight	Earthy	0.03	.....	....	.0005	.0005	.0050	.0000	.05	1.9	....	..

Of the twelve private sources investigated, seven proved good water, two, good but for lead, and three questionable or poor.

Canaan.—A private supply from Hart's Pond was introduced by the Crystal Lake Water Company in 1891.

Examination of Water from Crystal Lake Water Company.

Number.	Date of collection.	Appearance				Residue on Evapo'n		Ammonia		Nitrogen as		Chlorine.	Hardness.	Lead.	
		Turbidity.	Sediment.	Odor.	Color.	Total.	Fixed.	Free.	Albuminoid	Nitrates.	Nitrites.				
5235	1908 Apr. 15	V. slight	Slight	Sl. veg.	0.15	3.8	1.5	.0006	.0078	.0100	.0000	.10	1.2	....	..
7885	1910 May 13	Slight	Sl. floc.	Mark earthy	0.20	2.7	1.4	.0015	.0135	.0054	.0000	.10	1.1	....	..
8900	1911 May 18	None	V. slight	None	0.08	3.4	1.7	.0015	.0070	.0050	.0000	.10	1.2	....	..
9920	1912 May 15	Sl. opal	None	V. slight	0.10	3.5	2.0	.0008	.0035	.0025	.0000	.10	1.1	....	..

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Candia.—There are two supplies, the John A. Holt and the Jenness E. Dearborn, the first constructed in 1894, the other in 1889. The Holt supply is from an artesian well 100 feet deep, capacity 2,000 gallons daily, pumped by windmill to a reservoir of 6,000 gallons. This supplies twelve families and two shoe shops. The Dearborn supply is from a spring or well eight feet deep and twelve feet square, provided with a filter of brick and cement, supplying five families. Reservoir 2,500 gallons. There is also a public watering place at Candia Depot supplied by a well of D. H. Baker and Candia village is similarly supplied from well of Arthur Critchett.

Examination of Water from Supply of John A. Holt, East Candia.

Number.	Date of collection.	Appearance				Residue on Evapo'n		Ammonia		Nitrogen as		Chlorine.	Hardness.	Lead.	
		Turbidity.	Sediment.	Odor.	Color.	Total.	Fixed.	Free.	Albuminoid	Nitrates.	Nitrites.				
3371	1906 Jan. 5	V. slight	V. slight	S. foul	0.00	16.7	11.3	.0024	.0038	.5000	.0003	1.95	6.0	....	..
3908	Aug. 27	None	V. slight	None	0.10	15.6	8.8	.0010	.0024	.1000	.0000	2.40	4.7	....	..
4194	Nov. 28	None	None	None	0.05	19.0	13.5	.0010	.0014	.5000	.0000	2.25	5.6	.416	..
7748	1910 Mar. 24	V. slight	V. slight	None	No	25.6	22.3	.0010	.0030	.2000	.0020	4.14	8.4	....	..

Examination of Water from Spring of Jenness Dearborn.

8809	1911 Apr. 20	None	V. slight	None	0.00	4.5	2.7	.0010	.0015	.0025	.0000	.45	1.5	....	..
9936	1912 May 20	None	None	None	0.05	4.1	2.5	.0010	.0010	.0050	.0000	.48	1.5	....	..

Center Harbor.—This town has no public supply at present, although three or four private systems furnish water to a few houses other than those of the owners. A few families are furnished with water pumped from the lake by Mr. A. A. Bennett. The S. F. Emery supply, from springs, has not proved adequate for public use, in addition to the requirements of the hotel.

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Examination of Water from Spring Supply of S. F. Emery.

Number.	Date of collection.	Appearance				Residue on Evapo'n		Ammonia		Nitrogen as		Chlorine.	Hardness.	Lead.	
		Turbidity.	Sediment.	Odor.	Color.	Total.	Fixed.	Free.	Albuminoid	Nitrates.	Nitrites.				
7955	1910 June 12	None	S. earthy	S. earthy	0.05	6.5	4.0	.0016	.0010	.0150	.0000	.12	3.6	....	..
10046	1912 June 24	None	None	None	0.03	11.2	9.2	.0010	.0010	.0050	.0000	.11	5.0	....	..

Examination of Water from the Well of Mrs. Adolfo Munoz, used for Summer School Purposes.

9022	1911 June22	Slight	Sl. earth	Sl. earthy	0.05	.....	....	.0010	.0010	.0050	.0000	.12	1.4	....	..
9023	June 22	Slight	Sl.earthy	Earthy	0.05	.....	....	.0010	.0010	.0050	.0000	.25	1.9	....	*
10081	1912 June 26	V.slight	V. slight	None	0.00	.....	....	.0010	.0010	.0050	.0000	.23	1.9	....	..
10375	Aug. 12	None	None	None	0.00	.....	....	.0010	.0010	.0050	.0000	.22	1.9	....	*

* B. coli present.

Examination of Water from Lake Winnipesaukee, Taken in Front of the Colonial Hotel.

9334	1911 Sept.28	V.slight	V. slight	None	0.00	.....	....	.0010	.0010	.0050	.0000	.12	0.4	....	..
9335	Sept.28	V.slight	V. slight	None	0.05	.....	....	.0010	.0015	.0050	.0000	.14	0.4	....	..

Charlestown.—A gravity system from Mill Brook was completed during 1906. There are two reservoirs on the same brook, about 60 rods apart and two miles from the village. The water is mostly from springs. About six miles of galvanized iron service pipe are in use. Cost of system, $53,000. One hundred families are supplied—about two thirds of the population. During 1911 a gravity supply for North Charlestown was installed from a spring-fed brook. This has two miles of distributing mains and furnishes water to about twenty-five families.

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Examination of Water from Charlestown Public Supply.

Number.	Date of collection.	Appearance				Residue on Evapo'n		Ammonia		Nitrogen as		Chlorine.	Hardness.	Lead.	
		Turbidity.	Sediment.	Odor.	Color.	Total.	Fixed.	Free.	Albuminoids	Nitrates.	Nitrites.				
7057	1909 May 24	None	Sl. veg.	V.s.vg.	0.20	4.9	2.3	.0030	.0035	.0050	.0000	.10	0.7	....	..
7404	Sept.30	Slight	V. slight	None	0.30	4.8	2.5	.0010	.0010	.0050	.0000	.10	1.4	....	*
7749	1910 Mar.22	V.slight	Slight	Swampy	0.15	3.4	1.1	.0008	.0032	.0040	.0000	.16	0.6	....	..
8405	Sept. 3	V.slight	Sl. fibr.	Peculiar	0.30	5.4	2.7	.0002	.0102	.0380	.0000	.59	2.0	....	..
8432	Sept.19	V.slight	Slight	None	0.20	.....	....	.0010	.0100	.0100	.0000	.15	2.0	....	..
8797	1911 Apr. 17	V.slight	Sl. floc.	Earthy	0.30	3.0	1.5	.0020	.0080	.0100	.0000	.15	0.4	....	..
9611	Dec. 7	None	None	Sl. veg.	0.03	4.7	3.0	.0010	.0045	.0050	.0000	.08	1.2	[1]	..
9612	Dec. 7	None	V. slight	Earthy	0.12	3.2	2.1	.0015	.0035	.0050	.0000	.14	1.2	....	..
9848	1912 Apr. 21	None	Sl. floc.	None	0.18	3.1	2.1	.0010	.0025	.0025	.0000	.08	0.3	*	..
10035	June 17	V.slight	Slight	V.slight	0.05	5.5	3.7	.0010	.0010	.0050	.0000	.08	2.0	....	..

* B. coli present.
[1] "New Reservoir," presumably North Charlestown supply.

Examination of Water from the Well of G. L. Farrow, used by Public.

8715	1911 Feb. 27	S.ft. opal	V. slight	Sl. earthy	0.05	.....	....	.0010	.0030	.0100	.0000	.45	3.2	....	..

Three of the fifteen supplies of private character investigated proved to be sewage polluted, while two contained an excess of lead.

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Chester.

Examination of Water from the Well of A. H. Wilcomb.

Number.	Date of collection.	Appearance				Residue on Evapo'n		Ammonia		Nitrogen as		Chlorine.	Hardness.	Lead.	
		Turbidity.	Sediment.	Odor.	Color.	Total.	Fixed.	Free.	Albuminoid.	Nitrates.	Nitrites.				
10365	1912 Aug. 12	None	None	Sl. earthy	0.00	.....	....	.0010	.0010	.0050	.0000	.35	1.9	.010	..

Examination of Water from Well Supplying School, Forwarded by G. A. Dolker.

10177	1912 July 15	Sl. opal	V. slight	Foul	0.05	.....	....	.0040	.0020	.0100	.0000	.50	1.9	....	..

Claremont.—The town owns a water supply derived from streams situated on Green Mountain, together with an auxiliary system of wells dug along the bank of Sugar River. The latter, which are about fifteen feet deep and covered with five feet of earth, afford an abundant reserve supply, the water being pumped to the lowest of the stream reservoirs as needed. The main supply is drawn from the three brook reservoirs, the combined capacity of which is 32,000,000 gallons. Twenty-two miles of distributing mains are of cement and cast iron. Service pipes are of galvanized and cement-lined iron, supplying about thirteen hundred and fifty families. The watershed drained by this supply is mainly wooded, with some pasturage, and with but one or two dwellings.

During the present year surveys have been made for an additonal service reservoir to hold 20,000,000 gallons, it being the intention ultimately to extend the present supply to include White Walter Brook.

Besides the public supply there are two private systems of water works in Claremont; one, the Bible Hill Aqueduct, was built in 1870, the source being springs and a brook. The springs are excavated about a reservoir and the latter is also fed by springs in the bottom. Lead service pipes. About one hundred and sixty families are supplied by this system.

The other private system, known as the Grannis Water Works, built about 1892 and owned and operated by Herman Holt, Esq., is also supplied by springs. There are two small reservoirs from which

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this water is taken: one some 30 feet in diameter, and about three feet deep on an average; the other some 75 feet in diameter and of an average depth of about three feet.

Examination of Water from Town Supply.

Number.	Date of collection.	Appearance				Residue on Evapo'n		Ammonia		Nitrogen as		Chlorine.	Hardness.	Lead.	
		Turbidity.	Sediment.	Odor.	Color.	Total.	Fixed.	Free.	Albuminoid.	Nitrates.	Nitrites.				
5205	1908 Apr. 3	Slight	V. slight	S. earthy	0.25	4.8?	1.5	.0008	.0036	.0080	.0000	.21	1.2	....	..
5444	July 20	Marked	Consid. gel.	None	0.00	4.6	2.9	.0020	.0028	.0040	.0000	.09	1.2	....	..
5482	Aug. 6	Sl. opal	Mod. gel.	None	0.60	4.8	3.2	.0032	.0054	.0070	.0000	.13	1.8	....	*
5506	Aug. 13	V.slight	V. slight	Forei'n	0.15	5.5	2.5	.0014	.0090	.0000	.0000	.04	1.5	....	..
5507	Aug. 13	Slight	M. floc.	None	0.30	5.5	3.0	.0008	.0004	.0050	.0000	.14	1.1	....	..
5571	Aug. 28	V.slight	Sl. fine	Sl. foul	0.15	5.3	2.3	.0004	.0060	.0030	.0000	.12	1.9	....	*
5639	Sept.15	Mod.	S. fibr.	None	0.05	4.7	2.8	.0042	.0004	.0020	.0000	.14	1.9	....	*
5792	Oct. 22	None	V. slight	Woody	0.04	9.5	7.8	.0040	.0010	.0500	.0014	.21	1.4	....	..
5868	Nov.30	So. opal	Slight	None	0.10	3.4	2.1	.0001	.0015	.0000	.0000	.23	1.1	....	..
7079	1909 June 3	None	V. slight	None	0.10	.....	....	.0015	.0060	.0050	.0000	.11	1.5	....	..
7242	Aug. 4	None	None	None	0.20	3.5	1.8	.0020	0040	.0050	.0000	.10	1.0	....	..
7324	Aug. 30	None	None	None	0.00	6.0	....	.0002	.0010	.0050	.0000	.20	2.0	....	..
7403	Sept.30	V. faint	V. slight	None	0.05	4.1	2.6	.0010	.0015	.0050	.0000	.10	1.8	....	..
7741	.....	V.slight	None	Earthy	0.05	2.9	1.4	.0060	.0050	.0040	.0000	.21	.9	....	..
8111	1910 July 14	V.slight	V. slight	Sl. foul	0.05	3.9	2.3	.0000	.0010	.0025	.0000	.10	1.9	....	*
8420	Sept.14	None	None	Nonr	0.00	5.3	3.5	.0010	.0050	.0050	.0000	.15	2.6	....	1
8611	Jan. 3	None	None	None	0.05	3.8	1.6	.0010	.0020	.0025	.0000	.20	2.0	....	..
8682	Feb. 2	None	None	None	0.15	3.7	2.1	.0010	.0030	.0050	.0000	.15	1.9	....	..
8799	Apr. 18	V.slight	None	None	0.15	3.0	1.9	.0010	.0030	.0025	.0000	.10	0.4	....	..
8801	Apr. 19	None	None	None	0.00	5.5	4.2	.0010	.0010	.0050	.0000	.10	3.2	.012	..
9154	July 25	None	None	None	0.05	5.1	3.1	.0010	.0030	.0050	.0000	.15	1.4	....	..
9725	1912 Feb. 6	None	None	None	0.05	4.6	3.4	.0010	.0050	.0050	.0000	.14	1.4	....	..
10122	July 5	None	V. slight	None	0.05	6.0	4.5	.0010	.0020	.0050	.0000	.05	2.2	....	*2
10294	July 25	V. sl. opal	None	None	0.10	6.0	5.0	.0008	.0010	.0025	.0000	.18	1.8	....	..
10227	July 23	.....	.....	.....	....	.....	....	.....	.....	.....	.....	....	...	....	3

* B. coli present.
1 Wells on Kelsey's Island.
2 Whitewater Brook.
3 No coli present.

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Examination of Water from Bible Hill Aqueduct.

Number.	Date of collection.	Appearance				Residue on Evapo'n		Ammonia		Nitrogen as		Chlorine.	Hardness.	Lead.	
		Turbidity.	Sediment.	Odor.	Color.	Total.	Fixed.	Free.	Albuminoid	Nitrates.	Nitrites.				
5573	1908 Aug. 28	None	Mod. earthy	None	0.07	5.3	3.8	.0002	.0002	.0020	.0000	.12	2.8	High	..

Examination of Water Supplied by Grannis Water Works. (Holt System.)

7675	1909 Feb. 25	None	V. Sl. ferrug.	S. earthy	0.05	7.3	5.9	.0008	.0004	.0050	.0000	.09	5.3	....	..
7985	1910 June 23	None	Slight	None	0.05	5.8	4.0	.0010	.0020	.0025	.0000	.06	3.9	....	..

Examination of Water from Sugar River.

5749	1908 Oct. 12	None	V. slight	None	0.15	4.3	2.9	.0032	.0080	.0030	.0000	.25	1.2	....	*1
5818	Nov. 3	None	S. veg.	None	0.20	3.5	1.6	.0005	.0060	.0030	.0000	.22	0.9	....	*2
5819	Nov. 3	V. slight	S. veg.	S. earthy	0.10	5.4	3.1	.0010	.0035	.0030	.0000	.23	2.5	....	*2

* B. coli present; [1] Just above wells; [2] Near Banner Ice House; [3] Above upper dam.

Examination of Ice Cut from Sugar River.

5936	1909 Jan. 14	None	None	Faint sewage	0.00	1.0	....	.0015	.0020	.0000	.0000	.03	.0	....	..
5937	Jan. 14	None	V. slight	S. earthy	0.00	1.2	....	.0008	.0005	.0000	.0000	.03	.0	....	..
8859	1911 May 4	None	None	None	0.05	1.1	0.5	.0010	.0010	.0025	.0000	.03	0.0	....	..

Examination of Water from the Spring of A. A. Lewis.

8621	1911 Jan. 12	None	V. slight	None	0.00	.....	....	.0010	.0020	.0050	.0000	.03	1.9	....	..

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Colebrook.—There are two private systems, the J. E. Lombard Water Works, supplying about forty families with water from springs, and the Colebrook Water Company, which constitutes the principal supply. The source of the latter is a stream and springs, and the water flows about four miles through iron pipes, both main and service. Three fourths of the watershed is cleared, and one fourth wooded. There are many private wells within the radius reached by these supplies.

Examination of Water from Colebrook Water Company's Supply.

Number.	Date of collection.	Appearance				Residue on Evapo'n		Ammonia		Nitrogen as		Chlorine.	Hardness.	Lead.	
		Turbidity.	Sediment.	Odor.	Color.	Total.	Fixed.	Free.	Albuminoid.	Nitrates.	Nitrites.				
5210	1908 Apr. 3	None	None	None	0.10	7.0	5.6	.0014	.0030	.0080	.0000	.05	3.2	....	..
5635	Sept. 14	V. slight	V. slight	Earthy	0.10	.....	....	.0012	.0042	.0020	Tr.	.06	6.0	....	..
5636	Sept. 14	None	V. slight	Earthy	0.00	11.3	9.5	.0002	.0002	.0100	.0000	.08	7.6	....	..
7427	1909 Oct. 7	None	V. slight	None	0.05	9.2	5.3	.0010	.0100	.0050	.0000	.10	4.4	....	..
7781	1910 Apr. 10	None	S. coarse	None	0.70	1.7	.6	.0032	.0085	.0150	.0000	.07	2.2	....	..
8805	1911 Apr. 19	None	V. slight	None	0.00	6.6	3.9	.0020	.0080	.0050	.0000	.08	1.9	....	..
10071	1912 June 24	Slight	Sl. floc.	M. musty	0.20	.....	....	.0010	.0050	.0050	.0000	.05	2.6	....	..

Concord.—The Concord Water Works, owned and operated by the city, were installed in 1871–72. The source of the supply is Penacook Lake, with an area at high water of 337 acres; greatest area of good depth running from 10 to 75 feet; very little shallow water; bottom gravelly. The watershed, about 3 1-8 square miles, is partly wooded and partly cleared. The city owns and controls four fifths of the shore and during the past four or five years has effected the removal, through purchase, of the majority of the summer cottages. The remainder, some half dozen, are at present but little used, and are subject to special supervision of the city health officer.

The Plains Water Company, established in 1895, furnishes water to Concord Plains from a well six feet in diameter and dug in the sand to a depth of fifty feet. This well has been extended to a further

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depth of twelve feet by sinking an iron pipe at the bottom. The water is pumped to a wooden storage tank of 8,000 gallons' capacity.

Examination of Water from Supply of Concord.

Number.	Date of collection.	Appearance				Residue on Evapo'n		Ammonia		Nitrogen as		Chlorine.	Hardness.	Lead.	
		Turbidity.	Sediment.	Odor.	Color.	Total.	Fixed.	Free.	Albuminoids.	Nitrates.	Nitrites.				
5229	1908 Apr. 10	V.slight	Slight	Swampy	0.10	3.0	1.5	.0002	.0058	.0030	.0000	.15	0.4	....	..
5346	June 12	V.slight	Sl. floc.	Veg.	0.10	.....	....	.0006	.0044	.0030	.0000	.10	1.2	....	..
5866	Nov. 27	None	V. slight	S. marshy	0.05	2.4	1.0	.0010	.0080	.0000	.0000	.10	.3	....	..
7251	1909 Aug. 9	V. S. opal	V. slight	S. earthy	0.30	4.0	3.0	.0010	.0040	.0050	Tr.	.12	1.2	....	*1
7270	Aug. 12	None	None	None	0.05	3.4	1.8	.0008	.0040	.0050	.0000	.12	.4	....	..
7423	Oct. 7	None	None	None	0.00	2.7	1.2	.0002	.0060	.0050	.0000	.14	.2	....	..
7501	Nov. 3	None	V. slight	None	0.05	.....	....	.0002	.0050	.0000	.0000	.15	.9	....	2
7502	Nov. 3	None	None	Slight	0.05	2.2	.7	.0001	.0070	.0000	.0000	.16	.9	....	2
7740	1910 Mar. 22	Slight	V. slight	None	0.05	3.5	1.9	.0026	.0050	.0020	.0000	.10	.6	....	.
8176	July 24	V.slight	Med.floc.	Stale	0.10	.....	....	High	.0098	.0050	.0000	.10	1.0	....	3
8937	1911 June 1	V.slight	Slight	Dist. veg.	0.10	.....	....	0010	.0045	.0050	.0000	.10	0.4	....	2
8938	June 1	V.slight	Slight	None	0.05	1.3	0.8	.0010	.0045	.0050	.0000	.10	0.4	....	2
8935	June 1	Mod.	Sl. earthy	Dist. veg.	0.07	2.7	1.9	.0010	.0040	.0050	.0000	.10	0.6	....	..
9014	June 22	Slight	Sl. ferrug	Sl. veg.	0.08	2.2	1.1	.0010	.0120	.0050	.0000	.10	0.4	....	..
9430	Oct. 21	Slight	Sl. grey	Sl. arom	0.05	2.6	1.1	.0010	.0065	.0025	.0000	.10	.9	....	..
9518	Nov. 2	None	V. slight	Arom.	0.00	2.5	1.5	.0010	.0065	.0025	.0000	.10	0.6	....	..
9953	1912 May 23	V. sl. opal	Sl. floc.	Dist. foul	0.08	3.1	2.5	.0005	.0040	.0005	.0000	.11	0.3	....	..
10322	Aug. 6	V.slight	Sl. white	Slight	0.08	2.6	1.7	.0010	.0065	.0025	.0000	.11	0.3	....	..
10414	Aug. 26	None	None	None	0.05	.....	....	.0010	.0060	.0050	.0000	.10	0.6	....	..

* B. coli present; [1] Tap, Contoocook River Park; dead end of line; [2] Tap, St. Paul's School; [3] Taken from foul pipe.

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Examination of Water from Well in White's Park.

Number.	Date of collection.	Appearance				Residue on Evapo'n		Ammonia		Nitrogen as		Chlorine.	Hardness.	Lead.	
		Turbidity.	Sediment.	Odor.	Color.	Total.	Fixed.	Free.	Albuminoid	Nitrates.	Nitrites.				
7153	1909 July 1	None	None	None	0.00	.....	....	.0020	.0015	.4000	.0000	1.00	2.9	..	..
7230	Aug. 3	None	None	Distinct foul	0.00	11.5.	....	.0010	.0010	.4500	.0000	1.00	3.2	....	..
8175	1910 July 21	None	V. slight	None	0.05	12.2	5.6	.0014	.0028	.2000	.0000	0.95	3.9	....	..
10004	1912 June 5	Sl. opal	Mod. grey floc.	Slight	0.05	9.8	7.0	.0015	.0025	.2000	High	.95	3.2	*	..
10052	June 19	Sl. opal	Sl. silty	Slight	0.05	9.2	....	.0010	.0010	.1750	High	.95	2.0	[1]	

* B. coli present.
[1] Driven test well.

Examination of Water Collected from Contoocook River at River Hill in Front of Residence of H. S. Hering.

9271	1911 Aug. 14	Slight	Sl.earthy	Earthy	0.45	.....	....	.0050	.0075	.0050	.0000	.18	0.9	....	*

* B. coli present.

Examination of Water from Well of Herbert Quimby, River Hill.

8442	1910 Sept.22	Sl. opal	Slight	Clay	0.20	.....	....	V. high	V. high	.0050	.0000	.10	11.0	....	[1]
9540	1911 Nov. 8	H. opal	Slight	Strong musty	....	.....	....	V. high	High	.0030	.0000	.10	2.6	....	[1]

[1] The odor and organic matter exhibited by this supply are due to some property contained in the blue clay hard pan and are characteristic of a number of neighboring wells sunk in this stratum. This water is said to have shown marked improvement during the past year.

Examination of Water from Spring at State Hospital Cottage.

10034	1912 June 15	Sl. opal	V. slight	Sl. foul	0.08	.....	....	.0010	.0010	.0050	.0000	.05	1.9	....	..

Examination of Water from Well of East Congregational Society

9574	1911 Nov.20	Slight	M. ferrug	None	0.20	.....	....	.0015	.0025	.0030	.0000	.20	1.9	....	..

Examination of Water from Well of Rev. E. J. Aiken

9416	1911 Sept. 13	Sl. opal	H. floc.	M. veg.	0.20	9.8	6.0	V. high	High	.0200	V. high	.20	5.3	....	*

* B. coli present.

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Conway.—The Conway Aqueduct Company supplies Conway Village with water from a system of natural springs about two and one-half miles from the Center.

The village of North Conway and, except during the winter, the villages of Intervale and Kearsarge are furnished with water by the North Conway Water & Improvement Co., the source being three brooks located on Hurricane Mountain and the water of which is stored in three separate reservoirs, known as the Hurricane, the Middle and the Artist Falls reservoirs. Commencing at the Fairview in Intervale, all the houses to the southern limits of North Conway are supplied by this system.

Examination of Water from Faucet of Conway Aqueduct Company.

Number.	Date of collection.	Appearance				Residue on Evapo'n		Ammonia		Nitrogen as		Chlorine.	Hardness.	Lead.	
		Turbidity.	Sediment.	Odor.	Color.	Total.	Fixed.	Free.	Albuminoid.	Nitrates.	Nitrites.				
5226	1908 Apr. 13	V.slight	V. slight	None	0.20	2.3	1.5	.0000	.0010	.0030	.0000	.05	0.4	.000	..
5808	Oct. 28	None	None	S. earthy	0.15	1.7	0.6	.0030	.0010	.0000	.0000	.05	0.3	.025	..
5849	Nov.17	None	None	None	0.10	2.5	1.7	.0020	.0001	.0100	.0000	.04	0.1	.000	..
5850	Nov.17	None	None	None	0.10	2.4	1.4	.0010	.0005	.0100	.0000	.04	0.1	.000	..
6014	1909 Feb. 23	None	None	None	0.05	2.5	1.8	.0001	.0010	.0200	.0000	.05	0.1	....	..
7310	Aug. 20	None	Slight	Faint fishy	0.05	.....	....	.0010	.0008	.0050	.0000	.10	0.3	....	*
7334	Sept. 1	V.slight	V. slight	None	0.05	3.0	....	.0002	.0008	.0050	.0000	.05	0.3	....	*
7372	Sept.20	None	None	None	0.05	3.8	2.0	.0010	.0012	.0050	.0000	.08	0.9	....	*
7535	Dec. 1	None	None	None	0.00	2.3	1.6	.0010	.0020	.0050	.0000	.08	0.4	....	..
7753	1910 Mar.24	Slight	Slight	Earthy	0.20	4.2	2.3	.0004	.0036	.0040	.0000	.08	0.6	....	..
8133	July 15	None	V. slight	Musk	0.05	2.5	2.2	.0024	.0006	.0050	.0000	.05	0.9	....	..
8134	July 15	None	V. slight	None	0.05	2.4	1.7	.0002	.0004	.0050	.0000	.05	0.9	....	..
8265	Aug. 2	None	V. slight	None	0.00	.....	....	.0010	.0013	.0200	.0000	.04	0.9	.000	..
8276	Aug. 4	Mod.	Med.floc	.Musk	0.70	5.0	3.0	.0010	High	.0050	.0000	.05	1.6	....	*
8342	Aug. 22	None	S. floc.	S. earthy	0.00	2.5	1.0	.0010	.0015	.0050	.0000	.08	0.4	....	..
9297	1911 Aug. 16	None	None	None	0.00	4.0	2.6	.0015	.0020	.0025	.0000	.05	0.1	....	..
9298	Aug. 16	None	V. slight	None	0.00	3.8	2.8	.0010	.0015	.0025	.0000	.06	0.1	....	..
9494	Oct. 18	V.slight	V. slight	Dist. clay	0.20	5.0	3.0	.0010	.0015	.0025	.0000	.05	0.1	....	..
10209	1912 July 17	None	Sl. floc.	None	0.05	3.2	2.0	.0010	.0010	.0025	.0000	.05	0.1	.010	..
10210	July 17	None	V. slight	None	0.05	3.5	2.0	.0010	.0010	.0025	.0000	.05	0.1	....	..

* B. coli present.

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Eight of eleven samples received from private sources were found to represent pure water.

Cornish.

Examination of Ice and Water from Blow-me-down Brook.

Number.	Date of collection.	Appearance				Residue on Evapo'n		Ammonia		Nitrogen as		Chlorine.	Hardness.	Lead.	
		Turbidity.	Sediment.	Odor.	Color.	Total.	Fixed.	Free.	Albuminoid	Nitrates.	Nitrites.				
7581	1909 Dec. 23	None	V. slight	Earthy	0.00	.....	....	.0002	.0010	.0000	.0000	.05	1.5	....	[1]
7583	Dec. 26	V. faint	S.fibrous	S. earthy	0.00	.. ..	....	.0045	.0030	.0000	.0000	.05	0.3	....	[1]
9115	1911 July 16	Mod. opal	Mod. ferrug.	None	0.60	15.9	1.3	.0060	.0090	.0100	High	.45	4.0	....	*[2]
9116	July 16	None	Sl. coarse	None	0.05	4.3	3.8	.0050	.0020	.0050	.0000	.08	0.6	....	*[2]

* B. coli present. [1] Ice. [2] Water.

Croydon.

Examination of Water from Spring of J. C. Foveirn.

Number.	Date of collection.	Appearance				Residue on Evapo'n		Ammonia		Nitrogen as		Chlorine.	Hardness.	Lead.	
		Turbidity.	Sediment.	Odor.	Color.	Total.	Fixed.	Free.	Albuminoid	Nitrates.	Nitrites.				
9198	1911 Aug. 2	V. slight	None	None	0.00	.....	....	.0005	.0010	.0025	.0000	.03	1.9	Hi'h	..
9713	1912 Feb. 1	None	Slight	None	0.00	.....	....	.0050	.0020	.0025	Ft. trace	.35	0.9	....	..
9714	Feb. 1	None	V. slight	None	0.00	.....	....	.0010	.0010	.0050	.0000	.08	0.4	.100	..
9715	Feb. 1	None	None	None	0.00	.....	....	.0005	.0010	.0050	.0000	.05	0.3	.087	..

Examination of Water from Well of Addie Cooper.

9530	1911 Nov. 3	None	None	Veg.	0.00	.....	....	.0010	.0010	.0450	.0000	.10	1.9	.037	..

Examination of Water from Well of Otis J. Staniels.

9531	1911 Nov. 3	None	None	None	0.00	.....	....	.0010	.0020	.0500	.0000	2.80	3.9	.037	..

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Danbury.

Examination of Water from Well of Danbury Settlement Association.

Number.	Date of collection.	Appearance				Residue on Evapo'n		Ammonia		Nitrogen as		Chlorine.	Hardness.	Lead.	
		Turbidity.	Sediment.	Odor.	Color.	Total.	Fixed.	Free.	Albuminoid	Nitrates.	Nitrites.				
8870	1911 May 19	None	V. slight	None	0.05	.....	....	.0010	.0030	.0025	.0000	.10	1.9	....	..
8971	June 9	None	V. slight.	Faint	0.05	.....	....	.0010	.0060	.0100	.0000	.08	1.9	....	..

Examination of Water from Spring of the B. & M. R. R.

9389	1911 Sept. 5	V.slight	Mod. floc.	None	0.05	4.6	3.6	.0020	.0006	.0040	.0000	.19	1.9	Hi'h	..

Examination of Water from Well Supplying St. Paul's School Camp.

9074	1911 July 10	Slight	Slight	Sl. aromatic	0.08	.....	....	.0025	.0085	.0200	Trace	0.45	1.9	....	*
10069	1912 June 25	None	Slight	Sl. earthy	0.05	.....	....	.0010	.0010	.0250	.0000	0.25	2.3	....	..

* B. coli present.

But two of the eight samples received from the this town from private sources represented pure water. Four of the five examined for lead showed an excess of this metal.

Derry.—During 1910 the town of Derry purchased the Derry Water Works. This supply, built in 1890, consists of about 40 wells driven to a depth of fifty feet. The water is pumped to a stand pipe of 180,000 gallons' capacity.

The former practice of pumping from a polluted auxiliary (a brook) during times of low water or fire has been discontinued, it having been agreed that future resort to the brook supply shall be made only in case of a great emergency.

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Examination of Water from Supply of Derry Water Works Company.

Number.	Date of collection.	Appearance				Residue on Evapo'n		Ammonia		Nitrogen as		Chlorine.	Hardness.	Lead.	
		Turbidity.	Sediment.	Odor.	Color.	Total.	Fixed.	Free.	Albuminoid	Nitrates.	Nitrites.				
	1908														
5171	Mar.16	None	None	None	0.15	7.3	4.6	.0010	.0012	.0200	.0000	.40	3.2	....	..
5196	Mar.30	None	None	None	0.00	.....	.....	.0004	.0010	.0350	.0000	.86	2.6	....	..
5219	Apr. 8	None	None	None	0.00	4.7	3.1	High	.0028	.0150	.0000	.72	3.2	....	..
	1909														
5925	Jan. 6	None	None	None	0.05	8.3	4.5	.0001	.0008	.3500	.0000	.92	2.6	....	..
7271	Aug. 11	None	None	None	0.00	9.0	5.0	.0005	.0010	.1500	.0000	.70	2.4	....	..
	1910														
7754	Apr. 5	None	Non	None	0.05	8.7	5.7	.0016	.0042	.0750	.0000	.92	3.7	....	..
7908	May 20	None	S. earthy	S. earthy	0.10	9.6	6.6	.0010	.0020	.1500	.0010	.95	3.9	....	..
	1911														
8806	Apr. 20	None	V. slight	None	0.05	9 5	6.5	.0020	.0020	.0500	.0000	1.05	3.3	....	..
	1912														
9843	Apr. 19	None	Sl. coarse	None	0.05	8.8	5.5	.0020	.0015	.0200	.0000	1.06	2.3	....	..

Dover.—The supply originally installed by the city (in 1888) was taken from Willand's Pond, the original area of which (78¾ acres) has gradually become reduced to but 48 acres. Present average depth 25 feet; capacity 197,000,000 gallons. There are one and one-fourth square miles of watershed, mainly woods and pasture land but including Granite State and Central parks and a few summer cottages. The shores are well policed. In 1905 the Hussey Springs were added to the supply. This water has proved unsatisfactory on account of its iron content and the present draught from this source has been reduced to 150,000 gallons per day. The supply has been further augmented through the addition of two drilled wells, each 300 feet deep and furnishing about 100,000 gallons. The supply from all these sources, however, continues inadequate and during the past year several rivers, brooks and ponds have been under consideration by the city as additions to the system, but at this date no definite action has been taken.

During 1909 a slow sand filtration plant was installed, partly for the removal of the iron and partly to insure the purity of the pond supply. It is apparent from our examinations that most of the present

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projected sources will require filtration in order to afford water of satisfactory quality, and this introduces a complication in connection with pumpage.

The reservoir has a capacity of 2,000,000 gallons. In 1912 there were reported twenty-seven miles of cast iron mains, with eighteen miles of one-inch cement-lined service pipe. One thousand nine hundred and nineteen families, representing 95 per cent. of the population, are supplied.

Examination of Water from Dover Supply.

Number.	Date of collection.	Appearance				Residue on Evapo'n		Ammonia		Nitrogen as		Chlorine.	Hardness.	Lead.	
		Turbidity.	Sediment.	Odor.	Color.	Total.	Fixed.	Free.	Albuminoid	Nitrates.	Nitrites				
7013	1909 Apr. 28	None	None	None	0.05	8.9	7.6	.0060	.0020	.0050	.0000	.50	3.2	.010	..
7419	Oct. 7	S. opal	None	None	0.00	11.3	6.6	.0008	.0020	.0050	.0000	.45	3.2	.020	..
7573	Dec. 22	S. opal	Slight	None	0.00	12.5	9.0	.0025	.0040	.0050	.0000	.55	4.7	....	..
7574	Dec. 22	None	V. slight	None	0.00	8.5	6.0	.0020	.0070	.0050	.0000	.55	3.9	....	..
7612	1910 Jan. 21	None	Slight	None	0.00	6.0	4 0	0045	.0025	.0050	.00 0	.60	1.9	Tr.	..
7722	Mar.15	None	None	None	0.00	16.2	0.9	.9312	.0054	.0050	.0000	.79	9.3	.088	..
7723	Mar.15	None	None	None	0.05	9.7	7.2	.0004	High	.0040	.0000	.74	4.4	.035	..
7724	Mar.15	Slight	Mod.	None	0.05	11.1	8.3	.0012	.0120	.0050	.0000	.66	5.7	....	..
8045	July 7	None	S white	None	0.10	7.2	4.8	.0010	.0015	.0050	.0000	.60	3.5	.050	..
9544	1911 Nov. 9	V.slight	V. slight	None	0.05	6.9	6.0	.0010	.0015	.0025	.0000	.44	2.6	....	..
9545	Nov. 9	Slight	V. slight	None	0.08	7.5	6.0	.0015	.0015	.0025	.0000	.42	2.7	....	..
9546	Nov. 9	V.slight	V. slight	None	0.05	7.0	5.5	.0020	.0015	.0025	.0000	.42	2.6	....	..
9547	Nov. 9	V.slight	Sl. fibre	None	0.08	8.0	7.0	.0010	.0095	.0025	.0000	.44	2.4	....	..
10317	1912 Aug. 3	Moder-ate	Consid. ferrug.	None	0.12	7.0	6.2	.0110	.0010	.0100	.0000	.75	2.0	....	..
10318	Aug. 3	None	V. Sl. floc.	Slight	0.03	6.8	5.3	.0010	.0015	.0050	.0000	.45	2.1	....	..

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Examination of Water Collected from Bellamy River at Mile Hill, Proposed Source of Supply.

Number.	Date of collection.	Appearance				Residue on Evapo'n		Ammonia		Nitrogen as		Chlorine.	Hardness.	Lead.	
		Turbidity.	Sediment.	Odor.	Color.	Total.	Fixed.	Free.	Albuminoid	Nitrates.	Nitrites.				
9290	1911 Aug. 16	Slight	Sl. fibrous	Earthy	0.55	5.3	2.3	.0035	High	.0100	.0000	.18	0.4	....	*
10320	1912 Aug. 5	V.slight fibrous	Sl. floc.	Musty	0.70	4.2	3.2	.0015	V. high	.0050	.0000	.20	0.1	....	*

Examination of Water Collected from Raynor Brook, Proposed Source of Supply.

9291	1911 Aug. 16	Slight	Sl. fibrous	Earthy	0.50	8.0	5.2	.0030	High	.0100	.0000	.25	1.2	....	*

Examination of Water Collected from Isinglass River, Proposed Source of Supply.

9288	1911 Aug. 16	Slight	Sl. gelat.	Earthy	0.45	5.5	2.5	.0040	High	.0050	.0000	.20	0.1	....	*

Examination of Water Collected from Barbadoes Pond, Proposed Source of Supply.

9289	1911 Aug. 16	Slight	Musky	Earthy	0.30	3.4	2.4	.0015	High	.0050	.0000	.20	0.1	....	*
10319	1912 Aug. 5	M. fine	Sl. floc.	V. sl.	0.10	3.5	2.0	.0010	High	.0050	.0000	.18	....	....	

Examination of Water Collected from Stream (name not designated) Proposed Source of Supply.

9013	1911 June 29	Heavy	Mod. fibrous	Earthy	0.70	5.5	3.5	.0020	.0100	.0050	.0000	28	0.4	....	..
9859	1912 Apr. 25	Mod. opal	Sl. floc	None	0.35	4.5	2.7	.0010	.0035	.0050	.0000	.18	0.1	....	*
10295	July 28	Moderate	Sl. floc. fibrous	Slight	0.70	5.3	2.7	.0030	High	.0050	.0000	.20	0.1	....	*

* B. coli present.

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Examination of Water from Spring of Dover Bottling Company.

Number.	Date of collection.	Appearance				Residue on Evapo'n		Ammonia		Nitrogen as		Chlorine.	Hardness.	Lead.	
		Turbidity.	Sediment.	Odor.	Color.	Total.	Fixed.	Free.	Albuminoid	Nitrates.	Nitrites.				
8890	1911 May 17	Mod. opal	Slight	Dist. veg.	0.10	26.2	18.0	.0180	.0050	.1000	High	2.1	8.1	.012	*

Examination of Water from Spring of J. H. Prinetti.

8664	1911 Jan. 25	None	V. slight	None	0.00	.....	....	.0020	.0020	.0050	.0000	.50	6.0	....	*

Examination of Water from Well of D. A. Hammond.

9245	1911 Aug. 8	V. slight	Slight	Sl. earthy	0.00	.....	....	.0010	.0015	.0300	.0000	1.40	5.3	....	..

* B. coli present.

Durham.—Water is furnished to the college and to the village from four systems, all under separate management. The principal supply, known as the Durham Spring Water Company (Pettee supply) was inaugurated in 1893 and now consists of five dug and drilled wells, the water of which is pumped to a standpipe of 7,000 gallons' capacity. One mile of distributing mains; about one half of the village is supplied from this source.

In 1892 the New Hampshire College of Agriculture and Mechanic Arts established a system for supplying the various college buildings, the source being a pond of nine acres. This supply is now held in reserve for fire purposes only. The water for the drinking fountains, laboratories, and closets is supplied by a drilled well 265 feet deep, with a capacity of 40 gallons per minute. Water from the well, and in emergency from the pond, is pumped into a standpipe of 10,000 gallons capacity. There is about one-half mile of distributing mains.

The Durham Water Works, the only incorporated water company in town, was instituted in 1898 by J. W. Burnham. This company now buys water from the private deep drilled well of Mrs. Shirley Onderdonk. This water is pumped into a standpipe of 4,000 gallons

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capacity, and supplies about one tenth of the village. There are about 1,000 feet of distributing mains.

The George Hoitt system consists of two dug wells 10 feet deep and a deep drilled well with a capacity of 18 gallons per minute. The water from this cistern is pumped into a standpipe of 6,500 gallons' capacity and supplies about one fourth of the village. There are about 15,000 feet of distributing mains.

A private dug well of Mr. Edgar D. Chesley supplies his own house and two tenements, there being about 500 feet of mains. (See special report elsewhere.)

Examination of Water from Pettee Supply.

Number.	Date of collection.	Appearance				Residue on Evapo'n		Ammonia		Nitrogen as		Chlorine.	Hardness.	Lead.	
		Turbidity.	Sediment.	Odor.	Color.	Total.	Fixed.	Free.	Albuminoid	Nitrates.	Nitrites.				
7682	1910 Mar. 2	Mark. opal	Consid. earthy	Earthy	opaque	11.1	8.0	.0008	.0006	.0050	.0000	.83	5.4	....	..
9631	1911 Dec. 14	V. slight	Mod. floc.	Earthy	0.00	14.2	12.9	.0010	.0045	.0250	.0000	1.20	5.4	....	..
9634	Dec. 15	V. slight	Mod. grey	Sl. foul	0.00	8.1	6.8	.0040	.0030	.0100	.0000	0.40	3.2	....	..

Examination of Water Collected from College Reservoir.

9630	1911 Dec. 14	Sl. opal	Mod. floc.	Swampy	0.75	6.5	2.5	.0050	High	.0050	.0000	.035	1.8	....	..

Examination of Water from Artesian Well of New Hampshire College

7868	1910 May 4	Slight	Consid. ferrug.	Earthy	0.65	4.0	1.9	.0030	.0090	.0025	.0000	0.35	0.9	[1].10	..
9632	1911 Dec. 14	None	V. slight	Sl. earthy	0.02	20.9	19 2	.0005	.0010	.0300	.0000	2.80	5.3	....	..
9963	1912 June 25	None	None	None	0.00	19.2	17.2	.0008	.0010	.0350	.0000	2.75	4.7	....	..

[1] Construction incomplete. Mainly surface water.

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Examination of Water from Well of Carrie Buzzel.

Number.	Date of collection.	Appearance				Residue on Evapo'n		Ammonia		Nitrogen as		Chlorine.	Hardness.	Lead.	
		Turbidity.	Sediment.	Odor.	Color.	Total.	Fixed.	Free.	Albuminoid	Nitrates.	Nitrites.				
5939	1909 Jan. 18	Sl. opal	Mod. earthy	Earthy	0.05	.....	....	.0010	.0050	.4000	.0000	4.7	7.9	....	..
7636	1910 Feb. 2	Slight	V. slight	None	0.00	.....	....	.0070	.0080	.4000	.0004	1.7	8.9	....	..
9615	1911 Dec. 7	Mod. opal	Mod. gelat.	Sl. foul	0.00	.....	....	.0010	.0050	.0200	.0000	2.50	10.3	....	*

Examination of Water from Onderdonk Supply.

9614	1911 Dec. 7	None	None	None	0.05	.....	....	.0010	.0015	.0300	.0000	1.60	9.6	....	..
9635	Dec. 18	None	V. slight	None	0.00	22.0	19.5	.0010	.0025	.0300	.0000	1.55	9.7	....	..
9796	1912 Apr. 3	None	None	None	0.05	.....	....	.0010	.0020	.0100	.0000	1.80	6.7	.000	..

Examination of Water from Well of George Hoitt.

7669	1910 Feb. 22	None	None	None	0.05	.....	....	.0010	.0004	.0100	.0000	.45	5.6	....	..
8750	1911 Mar. 14	Slight	Sl. earthy	None	0.20	.....	....	.0012	.0086	.0080	.0000	.51	4.3	....	..
9676	1912 Jan. 9	H. opal	Mark. earthy	Mark. earthy	0.10	5.4	3.8	.0030	.0065	.0025	.0000	.40	3.7	....	..

Examination of Water from Well of Charles Smart.

9668	1911 Dec. 29	V. sl. opal	V. slight	None	0.00	.....	....	.0010	.0015	.0750	.0000	4.50	11.0	....	*

Examination of Water from Spring of the Beta Phi House.

8487	1910 Oct. 12	Slight	Sl. fibr.	None	.05	.....	....	.0020	.0030	.0250	.0000	1.00	6.7	....	..

* B. coli present.

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Examination of Water from Well of Syride Sullivan.

Number.	Date of collection.	Appearance				Residue on Evapo'n		Ammonia		Nitrogen as		Chlorine.	Hardness.	Lead.	
		Turbidity.	Sediment.	Odor.	Color.	Total.	Fixed.	Free.	Albuminoid	Nitrates.	Nitrites.				
9629	1911 Dec. 14	None	Slight	Slight	0.05	.....	....	.0005	.0045	.0200	High	.20	2.6	....	..

* B. coli present.

Examination of Water from Cistern of Durham School District.

9606	1911 Dec. 4	Slight	Slight	Mark. earthy	0.45	.....	....	.0200	.0085	.0050	Very high	0.12	4.6	.000	..

Examination of Water from Well of Edgar D. Chesley.

9685	1912 Jan. 16	None	Sl. fibr.	V.slight	0.05	43.8	35.3	.0040	.0065	.2500	.0000	7.50	12.4	....	..

Examination of Water from "Broth Hill Well."

9628	1911 Dec. 14	V. slight	V. slight	Sl. earthy	0.00	.....	....	.0010	.0030	.1250	.0000	2.10	10.3	....	..

Enfield.—The Enfield Village Fire District Water Works, built in 1902 and 1903, by Arthur W. Stone of Hartford, Vt., is owned by the precinct. The source of the supply is a pond of 21 acres in area, and an average depth of about eight feet, fed by springs. The watershed is about 2,000 acres, principally cleared land, with only two families living near. The water flows by gravity through four miles of iron pipe. Service pipes are lead. From one fourth to one third of the population are supplied from this system, with additional connections being made each week.

There are also two private systems of water works in town: the Mascoma Aqueduct Company, whose plant was built in 1884. This supply is from a spring two feet in depth, which supplies about 1,000 gallons daily. This is a gravity system, with one mile of lead main pipe, and also lead service pipe. Ten families are supplied with this water, but some of them also have the town water.

The other private system was built by the Enfield Aqueduct Com-

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pany in 1854, the source being a well 16 feet deep. This, also, is a gravity system with three fourths of a mile of cement-lined lead pipe for a main, and lead service pipes. The average daily consumption from this system is 1,320 gallons, by 40 families, but the town water is also supplied to some of these patrons.

Examination of Water from Village Fire District Water Works.

Number.	Date of collection.	Appearance				Residue on Evapo'n		Ammonia		Nitrogen as		Chlorine.	Hardness.	Lead.	
		Turbidity.	Sediment.	Odor.	Color.	Total.	Fixed.	Free.	Albuminoid	Nitrates.	Nitrites.				
	1904														
2075	June 20	V. slight	Slight	Dec. veg.	0.45	.....	....	.....	.....	.0000	.0000	.15	4.1	....	..
2411	Oct. 6	None	None	S. veg.	0.50	6.6	3.0	.0014	.0200	.0250	.0000	.05	1.2	....	..
	1905														
2910	June 19	None	None	S. veg.	0.40	5.5	2.7	.0000	.0116	.0200	.0000	.12	1.6	....	..
3095	Aug. 18	V. slight	Vone	S. veg.	0.50	5.7	2.7	.0020	.0152	.0100	.0000	.10	1.8	....	..
	1906														
3368	Jan. 5	V. slight	None	None	0.40	4.5	2.2	.0016	.0074	.0050	.0000	.07	2.0	....	..
3790	July 30	None	Slight	Veg.	0.40	4.8	2.0	.0022	.0168	.0000	.0000	.05	1.6	....	*
3790	July 30	None	S. fine	Veg.	0.40	4.8	2.0	.0022	.0168	.0000	.0000	.05	1.6	....	..
4011	Sept.28	Slight	Mod. fine	Mark'd veg.	0.50	6.5	2.0	.0014	.0204	.0050	.0000	.07	1.9	....	*
	1907														
4651	June 21	None	V. slight	Earthy	0.40	3.5	1.6	.0008	.0120	.0050	.0000	.05	1.5	....	..
	1908														
5601	Sept.14	Slight	V. slight	None	0.30	5.5	1.7	.0010	.0086	.0040	.0000	.12	1.5	....	..
5860	Nov.26	Slight	V. slight	Earthy	0.50	4.5	1.6	.0110	.0330	.0000	.0002	.06	1.5	....	*
5997	.....	None	Bone	Slight	0.30	.....	.....	.0160	.0140	.0100	.0000	.09	....	.....	..
5998	.....	None	None	Slight	0.30	.....	.....	.0160	.0100	.0150	.0000	.08	....	.....	..
	1909														
7210	July 22	H. fibre	.....	Pecul.	0.40	8.3	4.7	.0090	High	.0050	.0002	.05	1.2	....	*
7246	Aug. 5	V. slight	Sl. veg.	Consid. veg.	0.40	5.6	2.1	High	High	.0050	.0004	.05	1.4	....	..
7247	Aug. 5	Consid. opal	Slight	Veg.	opaque	8.0	2.5	Very high	Very high	.0050	.0000	.05	1.4	....	*
7306	Aug. 23	Mod.	Consid. floc.	Marked veg.	0.70	7.0	3.2	Very high	High	.0050	.0000	.05	2.3	....	..
7307	Aug. 23	Sl. opal	Mod.	Veg.	0.30	.....	....	High	High	.0050	.0000	.05	1.8	....	..
7455	Oct. 18	Slight	V. slight	Slight	0.30	4.2	1.0	.0030	.0050	High	.0000	.05	1.2	....	..
	1910														
7930	May 30	Sl. opal	None	Earthy	0.10	5.5	4.3	.0010	.0035	.0075	.0032	.07	3.5	....	†
8245	Aug. 1	Heavy	Heavy	Sweet	0.50	.....	....	High	Very high	.0040	.0000	.08	1.8	....	..
	1911														
8819	Apr. 25	V. slight	V. slight	Sl. marsh	0.25	3.2	1.7	.0010	.0040	.0050	.0000	.07	1.8	....	..

* B. coli present. † .10 Zinc.

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Examination of Water from Tap of Mascoma Aqueduct Company.

Number.	Date of collection.	Appearance				Residue on Evapo'n		Ammonia		Nitrogen as		Chlorine.	Hardness.	Lead.	
		Turbidity.	Sediment.	Odor.	Color.	Total.	Fixed.	Free.	Albuminoid	Nitrates.	Nitrites.				
3079	1905 Aug. 14	Slight	Consid. earthy	Slight	0.00	4.3	3.0	.0000	.0000	.0100	.0000	.07	0.7	....	..
3372	1906 Jan. 5	None	None	None	0.00	6.2	3.2	.0006	.0016	.0080	.0000	.05	1.1	....	..
4116	Oct. 31	None	Slight	V. Sl.	0.15	4.5	2.7	.0006	.0040	.0050	.0000	.07	1.2	.065	..
8818	1911 Apr. 25	None	None	None	0.05	3.1	2.0	.0010	.0015	.0050	.0000	0.4	0.5	.050	..

Examination of Water from Tap of Enfield Aqueduct Company.

3669	1906 Jan. 5	None	None	None	0.00	11.0	8.2	.0010	.0038	.0750	.0000	0.62	6.3	.015	*
4115	Oct. 31	None	Marked	None	0.15	12.2	10.3	.0010	.0052	.0050	.0000	0.35	5.3	....	..
4652	1907 June 21	Mod'ate	Mod'ate	Mod. veg.	0.40	10.6	8.2	.0066	.0060	.0050	Ft.tr.	1.18	6.0	Present	*
8820	1911 Apr. 25	V. faint	Sl. floc.	V. sl. marsh	0.05	11.4	6.8	.0010	.0020	.0600	.0000	0.90	6.1	.050	..
9270	Sept. 14	Slight	Consid.	None	0.40	6.0	3.5	.0130	.0165	.0025	.0000	0.05	1.2	....	..

*B. coli present.

Examination of Water from the Well of Boston & Maine Railroad.

8264	1910 Aug. 4	Slight	Sl. floc.	Sl. veg.	0.70	.....	....	.0020	.0050	.0000	.0050	1.10	6.7	.000	..
9195	1911 July 31	Slight	Sl. floc.	Slight	0.15	.....	....	Very high	.0065	.0050	High	2.20	7.4	....	..

Epping.—In 1906 the Epping Water Company instituted a supply from a stream. Sewage enters the latter at a number of points above the intake. The water is pumped to a standpipe of 15,000 gallons, from which fifty-eight families, representing about one half of Epping village, are supplied.

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Examination of Water Supply of Epping Water Company.

Number.	Date of collection.	Appearance				Residue on Evapo'n		Ammonia		Nitrogen as		Chlorine.	Hardness.	Lead.	
		Turbidity.	Sediment.	Odor.	Color.	Total.	Fixed.	Free.	Albuminoid	Nitrates.	Nitrites.				
4994	1907 Oct. 31	Slight	V. slight	S. earthy	0.80	4.7	1.5	.0002	.0110	.0060	.0000	.34	0.9	....	*
8567	1910 Nov. 31	None	V. slight	S. marshy	0.05	3.5	2.0	.0010	.0050	.0050	.0000	.30	1.2	....	..

* B. coli present.

Examination of Water from Well of A. E. Daniels.

9903	1912 Apr. 19	Moderate	Mod. earthy	Sl. earthy	0.10	.....	....	.0010	.0030	.0750	High	6.90	7.6	.010	..

Examination of Water from Well of John Leddy.

9958	1912 May 22	V. slight	V. slight	Earthy	0.00	.....	....	.0010	.0020	.3000	.0000	2.10	5.3	....	..

*B. coli present.

Of six samples representing private sources, five were found to represent water of polluted or doubtful character. One sample represented a case of malicious pollution of a well supply by the throwing in of rude carbolic oil.

Epsom.

Examination of Water from Spring of Charles Palmer.

Number.	Date of collection.	Appearance				Residue on Evapo'n		Ammonia		Nitrogen as		Chlorine.	Hardness.	Lead.	
		Turbidity.	Sediment.	Odor.	Color.	Total.	Fixed.	Free.	Albuminoid	Nitrates.	Nitrites.				
8658	1911 Jan. 24	V. slight	None	Sl. musty	0.05	.....	....	.0020	.0030	.0025	.0000	.10	1.9	.037	*

Examination of Water from Spring of Warren Tripp.

8759	1911 Mar.20	V. slight	None	None	0.00	.....	....	.0010	.0040	.0100	.0000	.10	1.2	.000	..

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Exeter.—The Exeter Water Works, installed in 1886, derives its supply from an artificial pond fed by springs and brook. Area about twenty acres, with average depth of ten feet; shores and bottom clayey. The water is pumped to a standpipe of 211,000 gallons and is distributed through fifteen miles of mains to 900 families, representing 95 per cent of the population.

This supply is filtered through filters of the mechanical type, the immediate object of which is the removal of the suspended clay, always present in the water and at times quite marked.

Examination of Water from Supply of Exeter Water Works.

Number.	Date of collection.	Appearance				Residue on Evapo'n		Ammonia		Nitrogen as		Chlorine.	Hardness.	Lead.	
		Turbidity.	Sediment.	Odor.	Color.	Total.	Fixed.	Free.	Albuminoid	Nitrates.	Nitrites.				
5146	1908 Feb. 27	S. opal	Marked earthy	V.slight	0.10	5.0	4.0	.0012	.0044	.0070	.0000	.57	1.9	....	..
5145	Feb. 27	Slight	Slight	Mark. earthy	0.10	4.8	3.0	.0004	.0036	.0070	.0000	.66	1.2	....	..
5144	Feb. 27	S. opal	Slight	Mark. earthy	0.05	4.5	3.0	.0006	.0034	.0030	.0000	.60	1.2	....	..
5143	Feb. 27	V. ft. op.	None	S. earthy	0.00	6.0	3.5	.0010	.0058	.0050	.0000	.65	1.2	....	..
5142	Feb. 27	Con. op.	S. earthy	Mark. earthy	Cl.	6.3	4.0	.0016	.0120	.0060	.0000	.68	0.4	....	*
5359	June 20	None	V. slight	Veg.	0.10	.....	....	.0002	.0040	.0060	.0000	.12	3.2	....	..
8854	1911 May 4	V. slight	Sl.	None	0.05	6.4	3.6	.0050	.0100	.0050	.0000	.50	2.6	....	..
9866	1912 Apr. 28	Ft. opal	V. slight	V.slight	0.05	5.4	3.3	.0010	.0045	.0050	.0000	.33	1.8	....	..

* B. coli present.

Examination of Water from Well of Mr. Mifflin.

8489	1910 Oct. 14	V.slight	Sl. floc.	None	0.05	.....	....	.0050	.0050	.0100	.0000	1.70	6.0	....	..

Examination of Water from Spring of Mrs. Kent.

10394	1912 Sept. 19	None	V. slight	None	0.00	.....	....	.0010	.0015	.0750	.0000	.90	9.0	....	..

Examination of Water from Well of A. Young.

9837	1912 Apr. 17	V.slight	Slight	None	0.00	.....	....	.0010	.0020	.0500	.0000	2.40	3.9	....	..

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Farmington.—Water is supplied from two systems, the earliest of which, owned by J. A. Fletcher, was established in 1898. This is from wells, being distributed to about five families from a reservoir of 100,000 gallons.

In 1903, the precinct supply, consisting of a number of wells and springs located near a power canal, was installed. This also includes the so-called Jenney Spring, situated at the other end of the village and which is subject to pollution from a nearby sewer. During periods of drought it is also a practice to discharge water from the canal upon a plot of sand and gravel some distance from the wells, into which such water filters. During 1911 the precinct was faced by the necessity of increasing the supply and a number of propositions were considered, resulting finally in the construction of a large well about seventy-five feet from the canal embankment. This became a matter of some controversy, it being maintained in some quarters that such well was supplied wholly by leakage from the canal, which is on a higher level and is subject to possible contamination at a number of points above. While it is impossible to deny that there may be leakage in some degree, yet it is evident that if so, the water has undergone a material degree of purification, and further, the springy character of the soil is support for the view that at least a large share of the water is independent of the canal. (See special report elsewhere.)

The present daily capacity of this supply is given as 100,000 gallons, reservoir 1,000,000 gallons. There are at present six miles of cast iron mains and about 295 families are supplied.

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Examination of Supply of Farmington Village Precinct.

Number.	Date of collection.	Appearance				Residue on Evapo'n.		Ammonia		Nitrogen as		Lead.	Hardness.	Chlorine.	
		Turbidity.	Sediment.	Odor.	Color.	Total.	Fixed.	Free.	Albuminoid	Nitrates.	Nitrites.				
5225	1908 Apr. 14	None	None	None	0.00	14.5	8.5	.0006	.0018	.0400	V. ft. trace	2.66	4.6	....	[1]
5909	Dec. 29	None	None	Mark. foul	0.10	7.1	4.4	.0080	.0070	.0100	Sl. tr.	0.69	2.2	....	..
7095	.....	None	None	None	0.00	18.0	11.1	.0010	.0015	.6000	Sl. tr.	2.60	4.6	....	[2]
7909	1910 May 20	V.slight	S. earthy	V. S. earthy	0.00	3.0	2.2	.0010	.0020	.0050	.0000	0.30	0.9	....	..
8736	1911 Mar. 9	None	V. slight	Sl. veg.	0.10	7.9	4.5	.0010	.0015	.0500	Trace	0.30	2.0	....	..
8800	Apr. 19	None	Sl. floc.	None	0.05	17.8	12.7	.0010	.0020	.1500	.0000	3.35	5.3	....	[1]
8840	May 2	None	Sl. floc.	None	0.30	4.7	3.1	.0010	.0060	.0050	.0000	0.17	0.6	....	[2]
8999	June 19	Slight	Black	Veg.	0.35	3.2	1.6	.0010	.0085	.0050	.0000	0.12	0.3	....	[3]
9000	June 19	Slight	Sl. fibre	Earthy	0.65	3.8	1.6	0015	.0120	.0025	.0000	0.08	1.1	....	[4]
9001	June 19	High opal	Sandy	Earthy	0.20	5.7	4.6	.0020	.0060	.0050	.0000	0.15	0.7	....	[3]
9002	June 19	Slight	Black	Mark. veg.	0.40	3.8	2.2	.0015	.0110	.0050	.0000	0.18	0.7	....	[5]
9048	June 30	Slight	Sl. silt	None	0.10	4.9	4.9	.0004	.0010	.0050	.0000	0.05	0.4	....	[6]
9099	July 13	Slight	Sl. floc.	None	0.20	3.1	1.2	.0004	.0033	.0050	.0000	0.05	0.5	....	[3]
9127	July 20	V. slight	Sl. floc	None	0.15	.....	....	.0004	.0030	.0025	.0000	0.05	0.3	....	[3]
9191	July 28	V.slight	Sl. floc.	None	0.10	.....	....	.0005	.0035	.0025	.0000	0.00	0.4	....	[3]
9435	Sept. 21	V.slight	Sl. floc.	None	0.05	2.4	1.3	.0005	.0010	.0025	.0000	0.05	1.1	....	[2]
9499	Oct. 20	None	V.slight	Earthy	0.08	3.6	2.1	.0060	.0075	.0025	.0000	0.08	1.2	....	[7]
9871	1912 Apr. 29	None	V. slight	None	0.20	4.4	2.0	.0005	.0040	.0050	.0000	0.13	0.7	....	[2]
10328	Aug. 6	Slight	Sl. gelat.	None	0.15	.....	....	.0015	.0060	.0050	.0000	0.14	1.6	....	[8]

* B. coli present.

[1] From Jenney Spring. This source is polluted by a nearby sewer. [2] Large well, constructed 1911, near bank of canal. [3] Spring back of well-house. [4] From canal used for power purposes. [5] Water seeping from base of canal embankment. [6] Sub-surface stream entering new well near top. [7] Spring near canal. [8] From reservoir, all sources.

Examination of Water from Driven Well of Farmington Shoe Company.

9081	1911 July 17	Mod. opal	Mod. earthy	Sl. veg.	0.45	.....	....	.0030	.0020	.0050	.0000	1.20	4.6	....	..

Examination of Water from Well of F. E. Edgerly.

10415	1912 Aug. 26	None	None	None	0.05	.....	....	.0025	.0020	.3000	.0000	1.40	4.6	.010	..

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Fitzwilliam.

Examination of Water from Laurel Lake.

Number.	Date of collection.	Appearance				Residue on Evapo'n		Ammonia		Nitrogen as		Chlorine.	Hardness.	Lead.	
		Turbidity.	Sediment.	Odor.	Color.	Total.	Fixed.	Free.	Albuminoid	Nitrates.	Nitrites.				
8520	19101 Nov. 1	None	V. slight	None	0.05	.....	....	.0005	.0030	.0050	.0000	.10	1.2	....	..

Francestown.—A private supply, inaugurated 25 years ago, is from a spring. The watershed is cleared, but no inhabitants. Wells are excavated 12 feet deep, and the water flows by gravity through half a mile of enameled iron pipe, both service and mains. Twenty families have this water, one tenth of the population. Seven of the thirteen samples examined proved to be polluted, and contained an excess of lead.

Examination of Water from Spring Reservoir.

Number.	Date of collection.	Appearance				Residue on Evapo'n		Ammonia		Nitrogen as		Chlorine.	Hardness.	Lead.	
		Turbidity.	Sediment.	Odor.	Color.	Total.	Fixed.	Free.	Albuminoid	Nitrates.	Nitrites.				
5360	1908 June 20	None	None	None	0.05	.....	....	.0002	.0006	.0150	.0000	.09	2.6	....	..
5902	Dec. 23	None	None	None	0.00	5.0	2.5	.0008	.0001	.0500	.0000	.19	0.6	....	..
7769	1910 Apr. 4	None	Slight	Sl. earthy	0.00	5.5	2.9	.0012	.0004	.0020	.0000	.16	2.4	....	..
8845	1911 May 3	None	None	None	0.00	4.1	3.7	.0010	.0010	.0100	.0000	.10	1.2	....	..
9885	1912 May 3	None	V. slight	None	0.00	3.5	2.0	.0015	.0015	.0050	.0000	.10	0.4	....	..

Examination of Water from Well of Mr. Jeffers.

9559	1911 Nov. 11	Sl. opal	None	None	0.00	.....	....	.0010	.0015	.0050	.0000	.10	1.2	Very high	..

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Franconia.—No public supply. A private company, known as the Franconia Water Supply Company, in 1888 or 1889, introduced a water supply from a spring a mile and a half distant. A later supply, introduced in 1907 by Whipple and Priest, is taken from the Gale River Spring.

Examination of Water of the Franconia Water Supply Company.

Number.	Date of collection.	Appearance				Residue on Evapo'n		Ammonia		Nitrogen as		Chlorine.	Hardness.	Lead.	
		Turbidity.	Sediment.	Odor.	Color.	Total.	Fixed.	Free.	Albuminoid	Nitrates.	Nitrites.				
4664	1907 June 24	None	S. coarse	Mark. swampy	0.40	5.5	3.2	.0004	.0040	.0050	.0000	.07	1.1	....	*
4665	June 24	None	None	V.slight	0.00	.....	....	.0002	.0006	.0500	.0000	.88	1.9	....	*
5977	1909 Feb. 5	None	None	None	0.00	5.8	4.6	.0010	.0002	.0750	.0000	.08	1.4	....	..

* B. coli present.

Examination of Water from Gale River Spring.

4958	1907 Oct. 15	None	V. slight	None	0.00	4.5	2.6	.0002	.0014	.0020	.0000	.11	1.9	....	..
5229	1908 Apr. 13	None	None	None	0.00	4.5	2.5	.0002	.0004	.0080	.0000	.06	1.9	....	..
7799	1910 Apr. 13	None	None	None	0.00	3.6	2.0	.0010	.0054	.0030	.0000	.40	1.5	....	..
8903	1911 May 19	None	Slight	None	0.00	4.1	2.1	.0010	.0010	.0050	.0000	.08	1.4	....	..
9881	1912 Apr. 30	None	None	None	0.05	4.7	3.5	.0006	.0010	.0025	.0000	.07	0.3	.010	..

Examination of Water from Lafayette Brook (near Profile House).

7347	1909 Sept. 9	None	None	None	0.00	.....	....	.0010	.0015	.0100	.0000	.10	0.4	....	..
8032	1910 July 5	None	V. slight	None	0.00	.....	....	.0004	.0030	.0050	.0000	.10	0.4	....	..
10323	1912 Aug. 5	None	V. slight	None	0.05	.....	....	.0005	.0010	.0050	.0000	.03	0.1	....	*[1]
10324	Aug. 5	None	V. slight	None	0.15	.....	....	0005	.0010	.0050	.0000	.03	0.1	....	[2]
10325	Aug. 5	None	V. slight	None	0.05	.....	....	.0008	.0010	.0100	.0000	.03	0.1	....	[3]

[1] Two hundred feet above hotel cesspool.
[2] Fifty rods above residence of P. W. Ayres.
[3] Opposite hotel cesspool.
* B. coli present.

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Franklin.—The Franklin Water Works, owned by the city, were built in 1891. The source consisted originally of springs, the water being pumped into a covered reservoir about 20 feet deep. Later, to obviate the necessity for direct pumpage from the Pemigewasset River during periods of drouth, a series of driven and tubular wells was constructed along the river bank. During 1906 the supply was further augmented by the construction of some catch basins which serve to collect the water from an extensive springy area lying at the base of a hill. In 1909 a system of filtration was established, the water being pumped from the river upon a sandbed, thence draining into a storage well. (For earlier analyses see previous reports.)

Examination of Water from Franklin Town Supply.

Number.	Date of collection.	Appearance				Residue on Evapo'n		Ammonia		Nitrogen as		Chlorine.	Hardness.	Lead.	
		Turbidity.	Sediment.	Odor.	Color.	Total.	Fixed.	Free.	Albuminoid	Nitrates.	Nitrites.				
5187	1908 Mar.24	Mod. opal	Slight	None	0.5	4.0	2.7	.0002	.0028	.0030	.0000	.18	1.2	....	..
5647	Sept 18	V. slight	V. slight	None	0.10	5.3	0.0	.0002	.0004	.0100	.0000	.16	.9	....	..
5846	Nov.17	None	Sl.ferrug.	None	0.10	3.3	1.8	.0005	.0010	.0100	.0000	.17	1.6	....	..
6058	1909 Mar.26	Marked	Med. earthy	Mark. earthy	opaque	6.4	4.5	.0008	.0025	.0100	.0000	.12	1.1	....	..
7767	1910 Apr. 5	Slight	Cons. floc.	Sl. earthy	0.05	4.5	3.6	.0010	.0016	.0050	.0000	.14	3.2	....	*
7862	May 4	None	Mod. ferrug.	V. Sl. earthy	0.05	3.7	2.9	.0005	.0015	.0075	.0000	.12	1.5	....	..
7880	May 11	V. slight	None	None	0.05	.....	....	.0005	.0010	.0100	.0000	.15	1.2	....	..
8732	1911 Mar. 8	Slight	V. slight	None	0.10	4.5	2.7	.0020	.0030	.0100	.0000	.12	1.2	....	..
8821	Apr. 26	None	None	None	0.05	3.8	3.3	.0010	.0015	.0100	.0000	.12	1.2	.025	..
9594	Nov.28	.....	.....	.....	....	.....	....	.....	.....	.....	.....	....	....	.100	..
9708	1912 Jan. 25	None	None	V.slight	0.05	.....	....	.0015	.0015	.0025	.0000	.15	1.2	.012	
9749	Feb. 8	.....	.....	.....	....	.....	....	.....	.....	.....	.....	....	....	.005	..
9846	Apr. 22	None	Sl. floc.	None	0.03	4.1	2.3	.0010	.0010	.0100	.0000	.13	1.1	....	..
9853	Apr. 23	.....	.....	.....	....	.....	....	.....	.....	.....	.....	....	....	Hi'h	..

* B. Coli present.

Examination of Water from the Well of Wiggin Gilman.

9075	1911 July 10	None	None	Sl. foul	0.00	.....	....	.0010	.0015	.0050	.0000	.45	2.0	.012	..

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Examination of Water from the Well of L. H. Hueber.

Number.	Date of collection.	Appearance				Residue on Evapo'n		Ammonia		Nitrogen as		Chlorine.	Hardness.	Lead.	
		Turbidity.	Sediment.	Odor.	Color.	Total.	Fixed.	Free.	Albuminoid.	Nitrates.	Nitrites.				
10093	1912 June 29	None	V. slight	Mark. foul	0.00	.....	....	.0010	.0015	.1000	Trace	1.70	4.6	....	..

Examination of Water from the Well of Mrs. C. C. Kendrick.

10409	1912 Aug. 22	None	None	None	0.00	.....	....	.0010	.0020	High	.0000	1.25	6.0	.040	..

Examination of thirty-one samples representing private sources showed twelve pure, seven pure except for lead contamination, six doubtful and six polluted. Eleven of the twenty-one lead tests showed excessive amounts of this metal, eight being of private, three of public supplies.

Freedom.

Examination of Water from a Stream, Proposed Public Supply.

Number.	Date of collection.	Appearance				Residue on Evapo'n		Ammonia		Nitrogen as		Chlorine.	Hardness.	Lead.	
		Turbidity.	Sediment.	Odor.	Color.	Total.	Fixed.	Free.	Albuminoids	Nitrates.	Nitrites.				
10377	1912 Aug. 12	V.slight	Sl. veg.	None	0.00	4.2	2.7	.0010	.0015	.0025	.0000	.05	1.5	....	*

* B. coli present.

Forty-seven samples were received for lead test only. Of these ten showed lead amounting to 0.050 parts or more.

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Gilmanton.

Examination of Water from Well of C. A. Dockham.

Number.	Date of collection.	Appearance				Residue on Evapo'n		Ammonia		Nitrogen as		Chlorine.	Hardness.	Lead.	
		Turbidity.	Sediment.	Odor.	Color.	Total.	Fixed.	Free.	Albuminoid	Nitrates.	Nitrites.				
8505	1910 Oct. 27	Heavy	Marked ferrug.	V. M. earthy	....	.....	....	V. high	V. high	.0100	.0000	4.9	12.4	....	..

Goffstown.—The present system was built in 1891 by the Goffstown Fire Precinct, Goffstown Village. The reservoir from which the water supply comes is situated between the Uncanoonuc Mountains and is surrounded by woodland. The reservoir is fed by springs in the bottom of the reservoir; by a brook, fed by springs flowing from the northeastern slope of the north mountain, and from a swamp flowing into the brook near the mouth of the reservoir. In addition to the above there has recently been built a storage reservoir of larger capacity than this one; both are at the base of Uncanoonuc Mountains.

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Number.	Date of collection.	Appearance				Residue on Evapo'n		Ammonia		Nitrogen as		Chlorine.	Hardness.	Lead.	
		Turbidity.	Sediment.	Odor.	Color.	Total.	Fixed.	Free.	Albuminoid	Nitrates.	Nitrites.				
201	1901 Oct. 10	None	Floc.veg.	Dec. vg.	1.40	5.60	2.20	.0042	.0276	.0000	.0002	.17	....	....	..
795	1902 Sept 11	None	None	Dec. vg.	1.90	8.70	2.00	.0028	.0234	.0000	.0002	.11	2.0	....	..
1388	1903 July 29	Slight	Floc.veg.	Dec.vg.	1.10	8.00	1.10	.0014	.0202	.0000	.0000	.16	0.9	....	..
1962	1904 May 17	None	None	V.slight	0.90	4.20	1.80	.0000	.0080	.0000	.0000	.13	1.7	....	..
2666	1905 Jan. 30	None	None	S. veg.	1.30	6.00	2.60	.0000	.0120	.0000	.0000	.15	0.7	....	..
3154	Sept. 9	None	None	Veg.	2.20	9.30	2.60	.0010	.0314	.0100	.0000	.10	1.5	....	..
3370	1906 Jan. 10	None	None	Veg.	0.80	4.80	2.00	.0014	.0024	.0100	.0000	.10	0.9	....	..
4174	Nov.21	None	None	None	0.30	4.30	2.80	.0014	.0070	.0100	.0000	.25	0.4	....	..
4448	1907 Apr. 16	None	V. slight	None	0.10	2.50	0.90	.0010	.0028	.0050	.0000	.23	0.4	....	..
4965	Oct. 18	None	None	None	0.20	3.20	2.30	.0012	.0096	.0040	.0000	.15	0.4	....	..
5233	1908 Apr. 15	None	None	None	0.00	2.50	1.00	.0004	.0014	.0060	.0000	.10	0.4	....	..
5430	July 20	V. ft. op.	Slight	Mk.foul	0.10	3.00	1.70	.0008	.0062	.0120	.0000	.11	1.8	....	..
5899	Dec. 23	None	None	Sl. arom.	0.70	6.40	3.50	.0015	.0150	.0000	.0000	.17	0.9	....	..
7780	1910 Apr. 11	None	Sl. floc.	Sl. earthy	0.70	2.30	0.80	.0004	.0050	.0020	.0000	.12	0.1	....	..
8834	1911 Apr. 30	V.slight	V. slight	V.slight	0.10	3.30	2.00	.0045	.0070	.0050	.0000	.12	0.3	....	..
9860	1912 Apr. 25	Slight	Sl. gelat.	Aromatic	0.28	3.10	1.80	.0005	.0020	.0025	.0000	.12	0.3	....	..

Examination of Water from the Supply of the Mystic Pond Ice Company.

10099	1912 June 24	None	V. slight	Dist. earthy	0.05	.....	....	.0005	.0010	.0025	.0000	.03	0.0	....	..

Gorham.—The earliest public supply, that of the Alpine Aqueduct Company, installed in 1873, consists of seventeen springs, all stoned and covered and situated in wooded land remote from habitations. Water is pumped to a reservoir of 300,000 gallons and supplies about 160 families. During 1905 the town established a supply from springs and a stream, the water-shed consisting of 1,200 acres of woodland.

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There are eight miles of cast iron mains, with galvanized iron service. 300 families, representing about two thirds of the inhabitants, are supplied by this system.

Examination of Water from Supply of the Alpine Aqueduct Company.

Number.	Date of collection.	Appearance				Residue on Evapo'n		Ammonia		Nitrogen as		Chlorine.	Hardness.	Lead.	
		Turbidity.	Sediment.	Odor.	Color.	Total.	Fixed.	Free.	Albuminoid	Nitrates.	Nitrites.				
7071	1909 June 4	None	None	None	0.20	3.3	1.8	.0005	.0040	.0200	.0000	.11	0.4	....	..
7285	Aug. 18	None	None	None	0.00	5.0	3.2	.0001	.0001	.0050	.0000	.07	1.6	....	..
7791	1910 Apr. 11	None	Sl.earthy	Earthy	0.10	3.2	1.8	.0010	.0070	.0500	.0000	.07	.6	....	..
9876	1912 Apr. 29	None	None	None	0.05	4.8	3.3	.0010	.0010	.0025	.0000	.07	0.3	....	..

Examination of Water from the Town Supply.

8825	1911 Apr. 26	Slight	Con. floc.	Earthy	0.00	4.2	2.7	.0010	.0085	.0450	.0000	.05	0.6	....	..
9849	1912 Apr. 22	None	None	None	0.15	4.0	2.0	.0005	.0035	.0025	.0000	.03	.01	....	..

Grantham.

Examination of Water from Spring of R. D. Thornton.

Number.	Date of collection.	Appearance				Residue on Evapo'n		Ammonia		Nitrogen as		Chlorine.	Hardness.	Lead.	
		Turbidity.	Sediment.	Odor.	Color.	Total.	Fixed.	Free.	Albuminoid	Nitrates.	Nitrites.				
9678	1912 Jan. 8	V. slight	Sl.earthy	Sl. earthy	0.05	.....	....	.0010	.0025	.0400	Trace	.10	1.9	.037	..
9712	Jan. 28	None	Sl. floc.	Sl. earthy	0.00	.....	....	.0005	.0010	.0025	.0000	.05	1.9	.100	..

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Examination of Water from Well Supplying M. E. Parsonage.

Number.	Date of collection.	Appearance				Residue on Evapo'n		Ammonia		Nitrogen as		Chlorine.	Hardness.	Lead.	
		Turbidity.	Sediment.	Odor.	Color.	Total.	Fixed.	Free.	Albuminoid	Nitrates.	Nitrites.				
9326	1911 Aug. 22	Sl. opal	V. slight	None	0.25	.....	.....	.0100	High	.0150	Trace	.35	3.90	.005	*

* B. coli present.

Examination of Water from the Cistern of James Green.

10031	1912 June 10	.....	.....	.....	...	.....	....	.....	.....	.....	.....	....	.....	.050	..

Greenfield.

Examination of Water from Well Supplying Brantwood Camp.

Number.	Date of collection.	Appearance				Residue on Evapo'n		Ammonia		Nitrogen as		Chlorine.	Hardness.	Lead.	
		Turbidity.	Sediment.	Odor.	Color.	Total.	Fixed.	Free.	Albuminoid.	Nitrates.	Nitrites.				
10169	1912 July 15	V. S. opal	Sl. floc.	Earthy	0.05	.....	....	.0005	.0010	.0100	.0000	.10	1.5	....	..

Greenville.—The town owns and operates a small water supply in the form of an artesian well 425 feet deep, ending in solid rock, and most of the distance below 125 feet in solid rock. The water is pumped to a brick reservoir of 20,000 gallons' capacity. Sixteen families and two schools take from this supply, 25 per cent. of the population. Of late the quality has undergone deterioration, having become impregnated with iron.

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Number.	Date of collection.	Appearance				Residue on Evapo'n		Ammonia		Nitrogen as		Chlorine.	Hardness.	Lead.	
		Turbidity.	Sediment.	Odor.	Color.	Total.	Fixed.	Free.	Albuminoid	Nitrates.	Nitrites.				
753	1902 Aug. 27	None	None	None	0.00	12.4	8.7	.0000	.0000	.0200	.0000	.12	3.9	....	..
2699	1905 Feb. 14	Much	Slight	V.slight	0.10	11.5	10.0	.0020	.0000	.0000	.0000	.15	3.9	....	..
2970	July 10	V. slight	Slight	S. foul	0.15	12.3	9.9	.0008	.0016	.0120	.0000	.17	4.5	....	..
3135	Sept. 1	V. slight	S. opal	Clayey	....	12.2	7.1	.0022	.0022	.0000	.0000	.16	4.0	....	..
3400	1906 Jan. 18	Heavy	Consid. ferrug.	None	0.50	17.8	13.5	.0014	.0074	.0050	.0005	.22	4.6	....	..
3417	Jan. 29	V. slight	None	None	0.10	13.3	8.5	.0014	.0034	.0050	.0001	.27	4.3	....	..
3649	May 31	M. opal	None	Veg.	0.20	13.5	9.8	.0010	.0014	.0050	.0000	.10	....	....	..
4123	Nov. 2	Slight	S. fine	S. veg.	0.10	14.0	10.1	.0008	.0036	.0050	.0000	.10	4.5	....	..
5966	1909 Feb. 3	Heavy	Sl earthy	Mark.	0.40	13.6	9.4	.0040	.0030	.0200	.0000	.15	3.9	....	*
5996	Feb. 19	Mod. opal	V. slight	None	0.10	10.7	7.3	.0360	.0020	.0100	.0000	.16	3.7	....	..
8755	1911 Mar. 22	Mod.	Heavy ferrug.	Dist. veg.	0.15	17.1	12.0	V. high	.0210	.0050	High	.13	4.2	....	..
8775	Apr. 6	Sl. opal	Sl. floc.	Dist. veg.	0.08	11.3	7.5	High	.0040	.0050	.0000	.10	4.2	....	..
9093	July 13	Mod. opal	Mod. earthy	V.slight	0.05	10.9	7.4	High	.0020	.0050	.0000	.10	3.5	....	..
9867	1912 Apr. 29	Mod. opal	Sl.earthy	Earthy	0.15	12.8	8.4	.0050	.0035	.0100	High	.20	3.9	....	*

* B. coli present.

Examination of Water from Well of Salliste Paradis.

8944	1911 June 1	Mod.	Sl. fibre	None	0.25	.....	....	High	High	.3000	High	4.40	3.9	....	*

* B. coli present.

Hampstead.

Examination of Water from Well of Charles Adams.

Number.	Date of collection.	Appearance				Residue on Evapo'n		Ammonia		Nitrogen as		Chlorine.	Hardness.	Lead.	
		Turbidity.	Sediment.	Odor.	Color.	Total.	Fixed.	Free.	Albuminoid	Nitrates.	Nitrites.				
8622	1911 Jan. 12	None	None	None	0.10	.....	....	Very High	Very High	.2250	High	9.0	12.4	....	..

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Hampton.—In 1907 the Hampton Water Works Company constructed and put in opration at the Hampton Beach Village Precinct a system of water works, the source being thirteen driven wells from 16 to 21 feet deep, located at the so-called Gill's Spring, with a collecting basin 16 feet deep. The rate of water flow is 260 gallons. The geological formation is gravel and coarse, sharp sand.

Water is pumped to a steel standpipe 15 feet by 90 feet, located on Great Boar's Head. There are four miles of cast iron distributing mains, while the service pipes are of galvanized wrought iron.

One hundred and thirty families, equivalent to 50 per cent. of the population, are using the supply.

Examination of Water from Hampton Water Works Company.

Number.	Date of collection.	Appearance				Residue on Evapo'n		Ammonia		Nitrogen as		Chlorine.	Hardness.	Lead.	
		Turbidity.	Sediment.	Odor.	Color.	Total.	Fixed.	Free.	Albuminoid	Nitrates.	Nitrites.				
5238	1908 Apr. 24	None	More earthy	Veg.	0.05	8.8	6.3	.0004	.0002	.0050	.0000	1.21	3.1	....	..
5383	June 26	None	None	None	0.10	10.3	6.7	.0010	.0004	.0500	.0000	1.40	3.9	....	..
5385	June 26	V. slight	None	Sl. foul	0.05	8.5	5.0	.0002	.0002	.0750	.0000	1.46	3.2	....	..
5510	Aug. 13	None	None	None	0.00	13.5	....	.0016	.0002	.2000	.0006	1.40	3.7	....	..
5511	Aug. 13	None	None	Foul	0.00	24.8	....	.0064	.0020	.0750	.0007	9.60	4.6	....	..
8277	1910 Aug. 5	None	None	None	0.00	10.7	6.4	.0010	.0010	.0500	.0000	1.35	3.9	....	..
8826	1911 Apr. 27	V. Sl. opal	None	Sl. veg.	0.05	8.4	6.8	.0015	.0010	.0300	.0000	1.40	3.7	....	..
9262	Aug. 11	V. slight	V. slight	Gasolene	0.05	10.3	7.0	.0010	.0015	.0100	Trace	1.35	3.5	....	..
9845	1912 Apr. 19	V. slight	V. slight.	Sl. earthy	0.05	11.0	5.5	.0010	.0015	.0050	.0000	1.18	2.4	....	..

Examination of Water from Well Driven at White's Island Point.

9277	1911 Aug. 15	V. slight	Much ferrug.	Earthy	0.10	152.0	....	.0015	.0025	.0050	.0000	32.0	4.6	....	*

* B. coli present.

Hancock.—A new supply, instituted in 1907, is obtained from Eaton's Brook. The latter is impounded by a dam and the resulting reservoir, located about two miles from the village, consists of a deep and narrow ravine, which was completely denuded of surface débris

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before flowing. Its capacity is 2,000,000 gallons. The mains are of iron, with galvanized iron service pipe. This system supplies 75 per cent. of the population.

Examination of Water from Eaton's Brook and Tributaries.

Number.	Date of collection.	Appearance				Residue on Evapo'n		Ammonia		Nitrogen as		Chlorine.	Hardness.	Lead.	
		Turbidity.	Sediment.	Odor.	Color.	Total.	Fixed.	Free.	Albuminoid	Nitrates.	Nitrites.				
5265	1908 Apr. 29	None	None	V.slight	0.10	3.9	2.5	.0004	.0034	.0120	.0000	.09	0.4	....	..
5962	1909 Feb. 3	V. ft. opal	V. slight	None	0.10	4.6	3.0	.0020	.0020	.0050	.0000	.09	1.5	....	..
7657	1910 Feb. 14	V. slight	Sl. fibre	Sl. earthy	0.08	2.9	2.4	.0004	.0054	.0050	.0000	.11	0.6	....	..
7787	Apr. 11	None	None	V.slight	0.20	2.3	1.4	.0006	.0100	.0020	.0000	.17	0.6	....	[1]*
8823	1911 Apr. 27	None	None	None	0.10	2.6	2.1	.0010	.0030	.0025	.0000	.18	0.6	....	..
9847	1912 Apr. 22	Slight	V. slight	Ft. earthy	0.10	3.2	2.7	.0010	.0015	.0050	.0000	.13	0.7	....	*

* B. coli present.
[1] .10 Zinc.

Hanover.—The supply of the Hanover Water Works, installed in 1893, consists of an artificial pond resulting from the impounding of a stream. Although highly charged with organic matter for some years, the character of this water has been gradually improving and is now of satisfactory quality. The Hanover Aqueduct Association also furnishes water from a number of springs, which yield about 4,000 gallons daily.

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Examination of Water from the Supply of the Hanover Water Works.
(For earlier analysis see previous reports.)

Number.	Date of collection.	Appearance				Residue on Evapo'n		Ammonia		Nitrogen as		Chlorine.	Hardness.	Lead.	
		Turbidity.	Sediment.	Odor.	Color.	Total.	Fixed.	Free.	Albuminoid	Nitrates.	Nitrites.				
5264	1908 Apr. 29	V. slight	S. floc.	None	0.15	3.6	2.6	.0018	.0068	.0100	.0000	.09	1.6	....	..
5965	1909 Feb. 3	None	None	None	0.30	6.4	3.5	.0040	.0110	.0500	.0000	.04	2.7	....	..
5971	Feb. 4	V. slight	V. slight	Earthy	0.60	6.6	3.2	High	.0160	.0200	Sl. trace	.04	2.6	....	..
7775	1910 Apr. 8	Mod.	Cons. floc.	Cons. earthy	0.40	6.5	4.4	.0008	.0070	.0020	.0000	.09	1.5	....	..
8863	1911 May 8	None	None	Earthy	0.28	3.0	2.0	.0010	.0090	.0050	.0000	.08	1.2	....	..
9875	1912 Apr. 23	Sl. opal	V. slight	None	0.20	4.0	2.5	.0010	.0045	.0050	.0000	.09	0.6	....	..

Haverhill.—The Haverhill Aqueduct Company furnishes water from a spring, the supply flowing by gravity through a lead main and lead service pipes.

Woodsville Fire District is supplied by the Woodsville Aqueduct Company, the source being the Ammonoosuc River, which receives all the sewage from the towns of Bath, Lisbon and Littleton, above. The water is pumped directly from the river through about five miles of distributing mains, and supplies about 80 per cent. of the population. This company also has five standpipes, from which spring water may be procured during a portion of the year.

Water is also furnished Woodsville village from the James Gordon and James R. Lowe springs and in addition, 80 families are now securing their drinking supply from the Mitchell spring, in Bath.

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Examination of Water from Supply of Haverhill Aqueduct Company.

Number.	Date of collection.	Appearance				Residue on Evapo'n		Ammonia		Nitrogen as		Chlorine.	Hardness.	Lead.	
		Turbidity.	Sediment.	Odor.	Color.	Total.	Fixed.	Free.	Albuminoid	Nitrates.	Nitrites.				
5261	1908 Apr. 29	None	None	None	0.05	4.5	2.9	.0004	.0018	.0020	.0000	.07	2.2	.050	..
7667	1910 Feb. 25	.....	.....	.....	....	.....	....	.....	.....	.....	.....	....	....	.200	..
7778	Apr. 10	None	Sl. Silt.	Sl. earthy	0.00	3.6	1.6	.0008	.0030	.0200	.0000	.09	1.1	.200	..
8982	1911 June 14	None	None	None	0.00	2.9	2.4	.0015	.0015	.0050	.0000	.06	2.2	.050	..
9880	1912 May 1	None	None	None	0.05	4.2	3.2	.0005	.0010	.0050	.0000	.10	0.9	.060	..

Examination of Water from Supply of Woodsville Aqueduct Company

4936	1907 Oct. 8	None	Slight	None	0.69	5.5	3.0	.0002	.0066	.0040	.0000	.08	1.6	....	..
5073	Dec. 13	Slight	V. slight	S. veg.	0.50	5.0	2.8	.0010	.0110	.0100	.0000	.08	1.9	....	..
7697	1910 Mar. 9	Sl. op.	Slight	Earthy	0.40	4.1	2.3	.0002	.0078	.0050	.0000	.15	1.4	....	..
9238	1911 Aug. 7	V. slight	Sl. floc.	None	0.20	6.1	4.1	.0010	.0045	.0050	.0000	.18	1.2	....	..
9897	1912 May 6	None	Mod. floc.	None	0.05	5.1	3.5	.0005	.0010	.0050	.0000	.21	2.2	.030	..

Examination of Water from Spring Supply of Pike Manufacturing Company.

7542	1909 Dec. 6	None	V. slight	None	0.00	4.5	....	.0002	.0005	.0500	.0000	.05	1.6	.000	..
8040	1910 July 6	Slight	V. slight	None	0.05	.....	....	.0015	.0010	.0025	.0000	.20	2.6	....	[1]
9500	1911 Oct. 23	V. slight	B. slight	None	0.05	.....	....	.0010	.0025	.0025	Ft. trace	.03	1.9	....	..
9501	Oct. 23	None	None	None	0.00	.....	....	.0010	.0015	.0025	Ft. trace	.05	1.9	....	..

[1] Well.

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Hebron.

Examination of Water from Stream, Proposed Public Supply.

Number.	Date of collection.	Appearance				Residue on Evapo'n		Ammonia		Nitrogen as		Chlorine.	Hardness.	Lead.	
		Turbidity.	Sediment.	Odor.	Color.	Total.	Fixed.	Free.	Albuminoid	Nitrates.	Nitrites.				
8360	1910 Aug. 30	None	Vl. sight	None	0.05	.....	....	.0010	.0030	.0050	.0000	.10	1.9	....	..

Henniker.—Water is supplied by the Henniker Spring Water Company, from springs and wells. The wells, three in number, are from 15 to 18 feet deep, with four springs used as feeders to them. The force is gravity, with four miles of galvanized iron main and service pipes. One hundred and thirty families, 95 per cent. of the population, take this water.

Examination of Water from a Faucet of the Henniker Spring Water Company

Number.	Date of collection.	Appearance				Residue on Evapo'n		Ammonia		Nitrogen as		Chlorine.	Hardness.	Lead.	
		Turbidity.	Sediment.	Odor.	Color.	Total.	Fixed.	Free.	Albuminoid	Nitrates.	Nitrites.				
5262	1908 Apr. 28	None	None	None	0.00	5.0	2.8	.0006	.0004	.0020	.0000	.09	0.4	....	..
5579	1909 Aug. 28	V. slight	V. slight	None	0.05	7.0	4.5	.0004	.0014	.0020	.0000	.19	1.9	....	..
5576	Sept. 3	Slight	V. slight	Slight	0.00	5.7	4.2	.0004	.0038	.0070	.0000	.09	0.4	....	..
7798	1910 Apr. 13	None	V. slight	None	0.00	2.5	2.2	.0006	.0054	.0500	.0001	.10	0.7	....	[1]
8858	1911 May 9	V. slight	V. slight	None	0.00	3.2	2.8	.0010	.0010	.0050	.0000	.11	0.4	....	..
9889	1912 May 4	None	V. slight	None	0.05	2.2	1.3	.0010	.0010	.0100	.0000	.08	0.3	....	..

[1] 0.5 Zinc.

Examination of Water from Well of Mrs. Ella M. Clough.

8395	1910 Sept. 7	None	V. slight	None	0.05	.....	....	.0012	.0020	.0380	.0000	.79	3.2	.030	..

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Hill.—The present system of Hill Water Works, owned by F. R. Woodward, consists of the original Sumner stream supply, supplemented by a spring with flow of forty gallons per minute. The major portion of the supply consists of the brook water, filtered through sandy soil and collected in a well, from which it is distributed through about two miles of cement-lined mains, with galvanized service pipes. Seventy families, or practically the whole village, is supplied from this system.

Examination of Water from the Woodward Supply.

Number.	Date of collection.	Appearance				Residue on Evapo'n		Ammonia		Nitrogen as		Chlorine.	Hardness.	Lead.	
		Turbidity.	Sediment.	Odor.	Color.	Total.	Fixed.	Free.	Albuminoid	Nitrates.	Nitrites.				
5260	1908 May 1	None	None	None	0.20	2.9	1.7	.0002	.0034	.0150	.0000	.10	0.9	....	..
5514	Aug. 18	None	Slight	None	0.15	4.7	3.2	.0002	.0008	.0080	.0000	.12	1.2	....	..
5972	1909 Feb. 4	None	None	None	0.10	3.7	2.2	.0010	.0025	.0100	.0000	.10	0.9	....	..
7845	1910 Apr. 28	V. slight	Slight	None	0.40	3.5	1.7	.0007	.0105	.0250	.0000	.15	1.2	....	..
8912	1911 May 25	None	V. slight	Earthy	0.15	3.9	2.4	.0010	.0020	.0300	.0000	.10	0.7	....	..
9915	1912 May 13	Slight	Mod. grey floc.	Earthy	0.30	3.7	2.9	.0010	.0030	.0050	.0000	.12	0.6	....	..

Hillsborough.—The Hillsborough Bridge Village Fire Precinct water supply, instituted in 1886, is from a pond of 500 acres; average depth about 15 feet; bottom, sand and ledge. The water flows by gravity to an intermediate reservoir of 500,000 gallons' capacity and supplies practically the entire population. Eight miles of cast iron and cement-lined mains, with service pipe of galvanized iron.

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Examination of Water from Faucet of the Hillsborough Bridge Village Fire Precinct.

Number.	Date of collection.	Appearance				Residue on Evapo'n		Ammonia		Nitrogen as		Chlorine.	Hardness.	Lead.	
		Turbidity.	Sediment.	Odor.	Color.	Total.	Fixed.	Free.	Albuminoid	Nitrates.	Nitrites.				
5263	1908 Apr. 28	None	Slight	None	0.30	3.5	2.2	.0004	.0036	.0100	.0000	.08	0.40	....	..
5558	Aug. 25	V. faint	V. slight	S. earthy	0.10	2.1	1.3	.0002	.0050	.0060	.0000	.13	0.40	....	..
5963	1909 Feb. 2	None	None	Hay	0.10	2.6	1.2	.0025	.0090	.0000	.0000	.06	0.10	....	..
7783	1910 Apr. 11	None	None	Sl. Swam-py	0.30	4.8	1.4	.0028	.0100	.0020	.0000	.14	0.60	....	..
8838	1911 Apr. 30	V. slight	V. slight	None	0.10	3.5	2.1	.0015	.0080	.0050	.0000	.15	0.40	....	..
9356	Aug. 30	V. slight	Sl. floc.	Sl. veg.	0.18	2.8	1.8	.0010	.0085	.0050	.0000	.15	0.40	....	..
9403	Sept. 8	None	None	V.slight	0.05	3.1	1.6	.0006	.0094	.0050	.0000	.21	0.30	....	..
9864	1912 Apr. 26	None	V. slight	Earthy	0.18	2.8	1.3	.0006	.0080	.0050	.0000	.14	0.30	....	..

Hinsdale.—This town has no water system. Many of the private wells are located at some distance from the dwellings and lead pipe is still commonly used as a conductor.

Examination of Water from the Spring of W. Rouillard.

Number.	Date of collection.	Appearance				Residue on Evapo'n		Ammonia		Nitrogen as		Chlorine.	Hardness.	Lead.	
		Turbidity.	Sediment.	Odor.	Color.	Total.	Fixed.	Free.	Albuminoid	Nitrates.	Nitrites.				
10307	1912 Aug. 1	None	Sl. floc.	None	.05	.....	....	.0010	.0010	.0025	.0000	.05	5.3	.030	..

Hooksett.—The Hooksett Aqueduct Company supplies water to about 20 per cent. of the population the source being Pinnacle Pond. Mt. St. Mary's Academy derives its supply from a stream, on which is located Bear Swamp. Some of the dwellings are furnished with water by the Dundee Mills, taken from the Merrimack River, but this is not used for drinking.

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Examination of Water from Pinnacle Pond.

Number.	Date of collection.	Appearance				Residue on Evapo'n		Ammonia		Nitrogen as		Chlorine.	Hardness.	Lead.	
		Turbidity.	Sediment.	Odor.	Color.	Total.	Fixed.	Free.	Albuminoid	Nitrates.	Nitrites.				
3399	1906 Jan. 18	V.slight	V. slight	S. veg.	0.0	3.4	2.1	.0010	.0050	.0050	.0000	.15	0.7	....	..

Examination of Water from a Well Used by the Pupils of the Union School District.

9450	1911 Sept.26	Slight	Sl. floc.	Sl. veg.	0.15	.....	....	.0020	.0025	.0050	.0000	.55	1.5	....	..
9783	1912 Mar.25	V. high opal	Heavy earthy	Sl. veg.	0.10	.....	....	.0030	.0035	.0100	.0000	.35	3.1	....	..

Examination of Water from Supply of Mt. St. Mary's Academy.

8578	1910 Dec. 6	None	V. slight	None	0.00	.....	....	.0010	.0010	.0050	.0000	.20	1.9	....	..
8579	Dec. 6	Slight	V. slight	Swampy	0.70	.....	....	.0010	.0050	.0050	.0000	.25	1.9	....	*

* B. coli present.

Hopkinton.—The Hopkinton Village Aqueduct Association furnishes water from wells by gravity to about three fourths of the population. Two miles of mains; service pipe, lead and iron. During 1911 an artesian well was added to the system; this water would have to be pumped and it has thus far not been found necessary to use it. Contoocook Village is supplied with water from Bear Pond.

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Examination of Water from Supply of Hopkinton Village Aqueduct Association.

Number.	Date of collection.	Appearance				Residue on Evapo'n		Ammonia		Nitrogen as		Chlorine.	Hardness.	Lead.	
		Turbidity.	Sediment.	Odor.	Color.	Total.	Fixed.	Free.	Albuminoid	Nitrates.	Nitrites.				
8318	1910 Aug. 15	None	None	None	0.00	.....	....	.0010	.0020	.0250	.0000	.15	1.9	.000	..
8916	1911 June 8	Slight	Sl. floc.	None	0.40	5.2	3.2	.0015	.0086	.0025	.0000	.06	1.4	....	*

* B. coli present.

Examination of Water from Contoocook Village Supply.

5283	1908 May 6	None	None	S.swampy	0.10	3.4	1.1	.0002	.0028	.0100	.0000	.14	0.4	....	..
7790	1910 Apr. 12	None	V. slight	None	0.00	1.7	0.9	.0014	.0090	.0020	.0000	.14	0.4	....	..
8829	1911 Apr. 27	V.slight	V. slight	Sl. earthy	0.10	3.5	2.7	.0015	.0040	.0025	.0000	.13	0.4	....	..
9865	1912 Apr. 27	Mod. opal	None	Sl. earthy	0.05	3.0	1.5	.0005	.0060	.0050	.0000	.14	0.4	....	..
10232	July 11	V.slight	Sl. floc.	Musty	0.07	.....	....	.0010	.0020	.0025	.0000	.05	0.4	....	..

Examination of Water from the Well of the Davis Paper Company.

10126	1912 July 8	None	None	None	0.05	.....	....	.0030	.0040	.5000	High	5.45	12.4	....	*
10416	Aug. 27	Ft. opal	V. slight	Foul	0.07	.....	....	.0010	.0025	.5000	High	3.90	11.2	....	..

* B. coli present.

Hudson.—The Hudson Water Works has supplied water from two large wells, located on the bank of a stream below the box-shop, the water being pumped to a standpipe of 50,000 gallons. During periods of drought it has been necessary to make use of an auxiliary supply taken from Ottarnic Pond and because of the unsatisfactory quality of the latter, action by the water-takers during 1912 resulted in the extension to Hudson Bridge Village of the Pennichuck (Nashua) system. (See special report elsewhere.)

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Examination of Water from Supply of Hudson Water Company

Number.	Date of collection.	Appearance				Residue on Evapo'n		Ammonia		Nitrogen as		Chlorine.	Hardness.	Lead.	
		Turbidity.	Sediment.	Odor.	Color.	Total.	Fixed.	Free.	Albuminoid	Nitrates.	Nitrites.				
5970	1909 Feb. 4	None	V. slight	None	0.00	5.8	4.0	.0002	.0001	.0300	.0000	.36	1.6	....	..
7565	Dec. 20	None	None	None	0.05	5.2	2.3	.0010	.0012	.0300	.0000	.45	3.6	....	..
7622	1910 Jan. 28	Slight	Slight	Swampy	0.70	5.7	2.6	.0025	.0110	.0050	.0000	.40	2.2	....	[1]
8271	Aug. 4	None	None	None	0.00	7.3	2.9	.0010	.0015	.0100	.0000	.35	2.6	....	..
8824	1911 Apr. 27	V.slight	V. slight	None	0.05	6.5	5.3	.0010	.0030	.0250	.0000	.35	1.7	....	..
9124	July 19	Mod.	Sl. veg.	Swampy	0.50	4.9	3.5	.0020	High	.0050	.0000	.20	1.4	....	[1]
9316	Aug. 21	Sl. coarse	Slight	Swampy	.50	4.7	3.0	.0030	High	.0100	.0000	.18	1.5	....	[1]
9516	Nov. 1	V.slight	V. slight	None	0.05	4.9	2.9	.0010	.0015	.0200	.0000	.35	1.9	....	..
9520	Nov.21	V.slight	Sl.coarse	None	0.08	4.5	2.5	.0030	.0020	.0150	.0000	.50	2.5	....	..
9521	Nov.21	None	Slight	Sl. marshy	0.45	5.3	2.0	.0120	.0145	.0050	.0000	.20	1.6	....	[1]
9884	1912 May 30	V.slight	V. slight	None	0.03	4.5	3.5	.0010	.0020	.0050	.0000	.35	2.2	....	..
10395	Aug. 19	Sl. opal	Sl. coarse	None	0.07	.....	....	.0010	.0010	.0350	.0000	.35	2.3	....	..

[1] Ottarnic Pond.

Jackson.—C. W. Gray & Co. installed a private water supply in 1904, the source being a stream mountain of about 1,000 acres watershed, all wooded, no inhabitants.

Number.	Date of collection.	Appearance				Residue on Evapo'n		Ammonia		Nitrogen as		Chlorine.	Hardness.	Lead.	
		Turbidity.	Sediment.	Odor.	Color.	Total.	Fixed.	Free.	Albuminoid	Nitrates.	Nitrites.				
7911	1910 May 23	None	None	Sl. Arom.	0.20	1.5	.5	.0010	.0035	.0025	.0000	.05	.4	....	..

Jaffrey.—The town instituted a system of water works in 1902, the source being a pond in Rindge having an area of 40 acres, an average depth of 20 feet, with hardpan bottom. The water flows by gravity

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through nine miles of 12-inch cast iron distributing mains; service-pipes, six-inch cast iron.

Examination of Water from Bullet Pond Supply.

Number.	Date of collection.	Appearance				Residue on Evapo'n		Ammonia		Nitrogen as		Chlorine.	Hardness.	Lead.	
		Turbidity.	Sediment.	Odor.	Color.	Total.	Fixed.	Free.	Albuminoid	Nitrates.	Nitrites.				
5282	1908 May 5	None	None	None	0.15	2.6	1.0	.0004	.0036	.0040	.0000	.12	0.3	....	..
5969	1909 Feb. 3	None	None	Sl. earthy	0.00	3.1	1.7	.0050	.0060	.0000	.0000	.10	0.3	....	..
7145	June 29	None	V. slight	Musty	0.05	2.5	1.2	.0005	.0060	.0000	.0000	.13	0.3	....	*
7166	July 6	None	Sl. veg.	Woody	.10	3.0	1.3	.0020	.0080	.0000	.0000	.10	0.3	....	..
7841	1910 Apr. 27	V.slight	V. slight	Slight	0.10	2.4	1.0	.0030	.0125	.0030	.0000	.15	0.4	....	..
8558	Nov.25	V.slight	V. slight	Mark. veg.	0.05	2.5	1.3	.0020	.0090	.0050	.0000	.10	1.3	....	..
8559	Nov.25	None	V. slight	Sl. veg.	0.10	2.8	1.5	.0040	.0090	.0050	.0000	.10	0.4	....	..
8806	1911 May 23	Slight	Slight	Veg.	0.08	3.0	1.5	.0010	.0070	.0025	.0000	.12	0.4	....	..
9878	1912 Apr. 30	None	None	None	0.03	5.0	3.3	.0015	.0060	.0050	.0000	.11	0.3	....	..

*B. coli present.

[1] River water pumped into system.

Examination of Water from Well of Annett Brothers.

8258	1910 Aug. 2	None	None	None	0.05	.....	....	.0012	.0026	.0050	.0000	.20	1.2	....	..
10230	1912 July 19	None	Sl. veg.	None	0.05	.....	....	.0010	.0010	.0050	.0000	.10	1.9	....	..

Keene.—The public supply, which furnished water to about 85 per cent of the population, is derived from two ponds—Sylvan Lake and Echo Lake. There are also a number of auxiliary sources. About forty miles of cast iron and cement-lined distributing mains; galvanized iron service pipe.

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Examination of Water from Keene Supply.

Number.	Date of collection.	Appearance				Residue on Evapo'n		Ammonia		Nitrogen as		Chlorine.	Hardness.	Lead.	
		Turbidity.	Sediment.	Odor.	Color.	Total.	Fixed.	Free.	Albuminoid	Nitrates.	Nitrites.				
5308	1908 May 21	None	V. slight	Slight	0.20	2.6	.9	.0014	.0124	.0080	.0000	.08	0.4	....	..
5594	Sept. 1	V. slight	Sl.ferrug.	None	0.08	4.4	1.4	.0020	.0044	.0100	.0000	.19	0.3	....	..
5714	Oct. 1	V. slight	Slight	Marshy	0.10	.....	....	.0005	.0010	.0100	.0000	.05	0.0	....	..
5750	Oct. 13	None	V. slight	Slight	0.15	3.7	2.3	.0050	.0100	.0000	.0000	.10	0.2	....	..
5782	Oct. 22	V. slight	None	Mark. earthy	0.10	1.0	0.3	.0040	.0115	.0000	.0000	.09	0.2	....	..
5817	Nov. 2	None	V. slight	Earthy	0.20	2.7	0.7	.0008	.0050	.0000	.0000	.10	0.3	....	..
7789	1910 Apr. 12	None	V. slight	Earthy	0.15	2.0	1.3	.0020	.0089	.0020	.0000	.15	0.4	....	..
8860	1911 May 6	None	Slight	Sl. earthy	0.28	3.1	1.6	.0025	.0050	.0050	.0000	.15	0.3	....	..
9595	Nov.27	V. slight	None	Earthy	0.05	2.8	1.5	.0010	.0055	.0050	.0000	.14	0.3	....	..
9596	Nov.27	None	V. slight	Sl. earthy	0.05	3.6	1.3	.0010	.0055	.0050	.0000	.15	0.3	....	..
9597	Nov.27	None	V. slight	None	0.20	3.2	1.7	.0010	.0045	.0025	.0000	.15	0.2	....	..
9598	Nov.27	None	None	Dist. veg.	0.20	3.2	1.2	.0010	.0105	.0050	.0000	.14	0.3	....	..
9874	1912 Apr. 29	V. slight	Sl. earthy	Sl. earthy	0.20	3.7	2.0	.0010	.0050	.0050	.0000	.15	0.3	....	..

Examination of Water from Spring of H. L. Goodnow.

8687	1911 Feb. 9	V. Sl. opal	V. Sl. fibre	V. Sl. veg.	0.00	.....	....	.0030	.0040	.0050	.0000	.04	1.9	....	*

* B. coli present.

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Kingston.

Examination of Water from Well of George B. Cilley.

Number.	Date of collection.	Appearance				Residue on Evapo'n		Ammonia		Nitrogen as		Chlorine.	Hardness.	Lead.	
		Turbidity.	Sediment.	Odor.	Color.	Total.	Fixed.	Free.	Albuminoid	Nitrates.	Nitrites.				
8711	1911 Feb. 27	None	V. slight	None	0.05	.....	....	.0010	.0025	.1000	.0000	6.40	7.4	....	..

Of eight samples received from private sources, six were found to represent polluted water.

Laconia.—The Laconia Water Company, incorporated in 1885, derives its supply from Lake Paugus, a branch of Lake Winnipesaukee. This bay receives sewage from The Weirs and from a number of cottages. The water is pumped to a reservoir of 2,700,000 gallons. Twenty-eight miles of cement and cast iron mains; cement-lined services; about 90 per cent. of the population supplied from this source.

During 1912 a chlorination plant was installed, for description of which and other special matter, see elsewhere.

Examination of Water from Various Sources, Laconia Water Works.

Number.	Date of collection.	Appearance				Residue on Evapo'n		Ammonia		Nitrogen as		Chlorine.	Hardness.	Lead.	
		Turbidity.	Sediment.	Odor.	Color.	Total.	Fixed.	Free.	Albuminoid	Nitrates.	Nitrites.				
5927	1909 Jan. 7	None	None	Sl. earthy	0.05	3.5	1.8	.0002	.0045	.0000	.0000	.08	0.6	....	..
5928	Jan. 7	None	V. slight	Sl. foul	0.05	2.7	1.3	.0010	.0045	.000C	.0000	.08	0.4	....	..
5929	Jan. 7	V. slight	V. slight	Sl. earthy	0.05	2.8	1.5	.0002	.0055	.0000	.0000	.09	0.4	....	..
5930	Jan. 7	V. slight	V. slight	None	0.05	2.6	1.3	.0002	.0050	.0000	.0000	.07	0.3	....	..
5935	Jan. 14	Mod.	Slight	Sl. earthy	0.05	2.6	1.2	.0035	.0100	.0000	.0000	.10	0.3	....	..
5947	Jan. 25	V. slight	Slight	Oily	0.05	3.2	1.0	.0025	.0060	.0000	.0000	.15	0.4	....	*
5948	Jan. 25	V. slight	V. slight	Sl. oily	0.05	2.4	1.3	.0020	.0060	.0000	.0000	.12	0.7	....	*
5949	Jan. 25	V. slight	Slight	Sl. oily	0.05	2.5	0.8	.0020	.0050	.0000	.0000	.11	0.3	....	*
5950	Jan. 25	Slight	Slight	Sl. swampy	0.20	4.4	2.2	.0040	.0090	.0000	.0000	.17	0.4	....	*
7786	1910 Apr. 12	None	None	Dist. veg.	0.05	2.2	0.6	.0014	.0089	.0010	.0000	.15	0.3	....	..
8414	Sept.12	None	None	Earthy	0.10	3.0	1.4	.0010	.0060	.0050	.0000	.13	1.2	....	..
8417	Sept.12	None	V. slight	V.slight	0.00	2.7	1.4	.0025	High	.0100	.0000	.15	1.2	....	..
8562	Nov.29	V. slight	None	V. S. earthy	0.05	2.7	1.2	.0015	.0070	.0050	.0000	.15	1.9	....	..
8563	Nov.29	Slight	V. slight	None	0.05	3.1	1.8	.0010	.0050	.0050	.0000	.12	1.2	....	..

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Examination of Water from Various Sources, Laconia Water Works.—Continued.

Number.	Date of collection.	Appearance				Residue on Evapo'n		Ammonia		Nitrogen as		Chlorine.	Hardness.	Lead.	
		Turbidity.	Sediment.	Odor.	Color.	Total.	Fixed.	Free.	Albuminoid	Nitrates.	Nitrites.				
8852	1911 May 4	None	V. slight	None	0.00	2.6	1.6	.0015	.0020	.0025	.0000	.20	0.1	....	..
8853	May 4	V.slight	V. slight	Dist. foul	0.05	2.2	1.5	.0010	.0050	.0025	.0000	.15	0.4	....	..
9009	June 21	Slight	Sl. floc.	Earthy.	0.10	2.4	1.2	.0010	.0060	.0025	.0000	.15	0.4	....	*
9050	July 3	.....	.....	.....	....	....	....	.....	.....	.....	.....	....	....	....	*
9066	July 7	V. Sl. fibrous	Sl. fibrous	V.slight	0.05	2.6	1.8	.0010	.0055	.0025	.0000	.03	0.3	....	*6
9067	July 7	V.slight	Sl. fibrous	V.slight	0.00	2.8	1.6	.0012	.0050	.0025	.0000	.05	0.4	....	6
9069	July 7	.....	.....	.....	....	....	....	.....	.....	.....	.....	....	....	....	*
9079	July 11	.....	.....	.....	....	....	....	.....	.....	.....	.....	....	....	....	*6
9080	July 11	.....	.....	.....	....	....	....	.....	.....	.....	.....	....	....	....	†6
9085	July 11	.....	.....	.....	....	....	....	.....	.....	.....	.....	....	....	....	*
9102	July 17	.....	.....	.....	....	....	....	.....	.....	.....	.....	....	....	....	*6
9103	July 17	.....	.....	.....	....	....	....	.....	.....	.....	.....	....	....	....	*6
9014	July 17	.....	.....	.....	....	....	....	.....	.....	.....	.....	....	....	....	*6
9125	July 19	V.slight	Sl. floc.	Sl. earthy	0.10	3.0	2.8	.0010	.0015	.0050	.0000	.08	0.1	....	*6
9130	July 30	V.slight	Sl.coarse	Sl. earthy	0.10	.....	....	.0015	.0045	.0025	Trace	.17	0.4	....	..
9172	July 31	.....	.....	.....	....	....	....	.....	.....	.....	.....	....	....	....	*
9173	July 31	.....	.....	.....	....	....	....	.....	.....	.....	.....	....	....	....	*6
9174	July 31	.....	.....	.....	....	....	....	.....	.....	.....	.....	....	....	....	*7
9175	July 31	.....	.....	.....	....	....	....	.....	.....	.....	.....	....	....	....	*6
9176	July 31	.....	.....	.....	....	....	....	.....	.....	.....	.....	....	....	....	*
9233	Aug. 4	None	Slight	Musty	0.05	4.3	3.3	.0010	.0020	.0025	.0000	.11	0.1	....	..
9264	Aug. 15	.....	.....	.....	....	....	....	.....	.....	.....	.....	....	....	....	†6
9265	Aug. 15	.....	.....	.....	....	....	....	.....	.....	.....	.....	....	....	....	†5
9216	Aug. 2	.....	.....	.....	....	....	....	.....	.....	.....	.....	....	....	....	†10
9217	Aug. 2	.....	.....	.....	....	....	....	.....	.....	.....	.....	....	....	....	†2
9218	Aug. 2	.....	.....	.....	....	....	....	.....	.....	.....	.....	....	....	....	†9
9219	Aug. 2	.....	.....	.....	....	....	....	.....	.....	.....	.....	....	....	....	†5
9224	Aug. 2	.....	.....	.....	....	....	....	.....	.....	.....	.....	....	....	....	*6
9266	Aug. 15	.....	.....	.....	....	....	....	.....	.....	.....	.....	....	....	....	†
9267	Aug. 15	.....	.....	.....	....	....	....	.....	.....	.....	.....	....	....	....	*6
9377	Sept. 5	.....	.....	.....	....	....	....	.....	.....	.....	.....	....	....	....	*6
9378	Sept. 5	.....	.....	.....	....	....	....	.....	.....	.....	.....	....	....	....	*6
9379	Sept. 5	.....	.....	.....	....	....	....	.....	.....	.....	.....	....	....	....	†10

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Examination of Water Collected from Various Sources, Laconia Water Works.—Concluded.

Number.	Date of collection.	Appearance				Residue on Evapo'n		Ammonia		Nitrogen as		Chlorine.	Hardness.	Lead.	
		Turbidity.	Sediment.	Odor.	Color.	Total.	Fixed.	Free.	Albuminoid	Nitrates.	Nitrites.				
9380	1911 Sept. 5	.....	.....	.....	....	.....	....	.....	.....	.....	.....	....	.....	....	*11
9381	Sept. 5	.....	.....	.....	....	.....	....	.....	.....	.....	.....	....	....	....	†
9382	Sept. 5	.....	.....	.....	....	.....	....	.....	.....	.....	.....	....	....	....	†9
9557	Nov.13	None	V. slight	Slight	0.00	2.1	1.3	.0020	.0065	.0025	.0000	.13	0.6	....	10
9558	Nov.13	None	V. slight	Sl. earthy	0.00	2.0	1.4	.0025	.0060	.0025	.0000	.13	0.4	....	..
9623	Dec. 12	V.slight	V. slight	Acrid	0.03	2.4	1.3	.0010	.0060	.0025	.0000	.12	0.4	....	..
9624	Dec. 12	V.slight	None	Acrid	0.03	3.4	1.5	.0010	.0060	.0025	.0000	.13	0.4	....	10
9745	1912 Mar. 7	.....	.....	.....	....	.....	....	.....	.....	.....	.....	....	.....	....	†10
9768	Mar.14	Sl. opal	V. slight	Sl. veg.	0.05	2.2	0.6	.0015	.0035	.0050	.0000	.14	0.4	....	..
9769	Mar.14	None	None	Sl. veg.	0.03	2.6	0.7	.0020	.0045	.0050	.0000	.13	0.4	....	10
9952	May 23	None	V. slight	Slight	0.05	.....	.....	.0010	.0015	.0050	.0000	.14	0.4	....	..
10207	July 18	None	None	None	0.05	.....	....	.0010	.0015	.0025	.0000	.14	0.4	....	*
10385	Aug. 16	None	None	Earthy	0.03	.....	....	.0010	.0015	.0025	.0000	.14	0.4	....	10
10386	Aug. 16	None	V. slight	None	0.03	.....	....	.0010	.0015	.0025	.0000	.14	0.4	....	..

* B. Coli present; † B. Coli absent; [1]Near Independent Ice Houses; [2]Just above intake; [3]Weirs Channel; [4]Mouth of Black Brook, near railroad bridge; [5]Lake Paugus, one and one-half miles above intake; [6]Front of Eagle Island; [7]Near Glendale; [8]Near Mayo's Boat house; [9]Gilford Brook; [10]Tap from reservoir; [11]Horse Island.

Examination of Water from Opeechee Lake, Water Supply for the State School for the Feeble-Minded.

1221	1903 June 10	None	Sl. fine	V.slight	0.05	3.9	0.6	.0000	.0080	.0000	.0000	.15	1.5	....	..
1222	June 10	None	Sl. fine	V.slight	0.05	6.2	1.6	.0000	.0074	.0000	.0000	.15	1.5	....	..
2000	1904 May 31	Slight	Sl. fine	S. foul	0.05	3.4	1.4	.0000	.0084	.0050	.0000	.15	1.1	....	..
3173	1905 Sept.17	V.slight	None	None	0.00	3.7	1.5	.0028	.0130	.0050	.0000	.15	0.7	....	..
3474	1906 Feb. 21	None	V. slight	None	0.00	2.7	1.5	.0030	.0080	.0050	.0000	.20	1.2	....	..
4173	Nov.20	None	V. slight	None	0.10	4.0	3.0	.0034	.0104	.0050	.0000	.17	1.2	....	*
6055	.....	Slight	S. earthy	None	0.10	3.1	1.6	.0040	.0140	.0150	.0000	.07	0.4	....	..
9113	1911 July 24	V.slight	Sl. veg.	None	0.08	.....	....	.0030	.0045	.0050	.0000	.10	0.4	....	..

* B. coli present.

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Examination of Water from Source of City Ice Supply.

Number.	Date of collection.	Appearance				Residue on Evapo'n		Ammonia		Nitrogen as		Chlorine.	Hardness.	Lead.	
		Turbidity.	Sediment.	Odor.	Color.	Total.	Fixed.	Free.	Albuminoid	Nitrates.	Nitrites.				
9832	1912 Apr. 17	Sl. opal	Slight	Sl. earthy	0.08	2.8	2.0	.0020	.0060	.0025	.0000	.12	0.3	....	..

Examination of Water from Pinnacle Ridge Spring Used by the Public.

9078	1911 July 11	None	None	None	0.05	.....	....	.0010	.0010	.0025	.0000	.03	1.2	....	..

Examination of Water from the Well of W. D. Huse & Sons.

9902	1912 May 8	None	None	None	0.00	.....	....	.0010	.0010	.0500	.0000	1.55	5.3	....	..

Examination of Water from Spring of Ben Turgeon.

9257	1911 Aug. 11	V. slight	V. sl. fibre	Sl. stale	0.00	.....	....	.0010	.0015	.0025	Trace	4.30	9.6	....	..

Examination of Water from Well of Joseph Raushe.

9126	1911 July 24	Moderate	Mod. ferrug	Slight	0.05	.....	....	V. high	.0040	.3000	High	7.90	11.0	....	*

* B. coli present.

Examination of Water from Tap at E. L. Evans, Supplying Methodist Camp Meeting Association.

9153	1911 July 25	V. slight	None	None	0.10	.....	....	.0010	.0055	.0050	.0000	.15	1.1	....	*

*B. coli present.

Examination of Water from Marsh Hill Spring.

8852	1911 May 4	None	V. slight	None	0.00	2.6	1.6	.0015	.0020	.0025	.0000	.20	0.1	....	..

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Examination of Water from Spring of William Rowe, Located just above Marsh Hill Spring.

Number.	Date of collection.	Appearance				Residue on Evapo'n		Ammonia		Nitrogen as		Chlorine.	Hardness.	Lead.	
		Turbidity.	Sediment.	Odor.	Color.	Total.	Fixed.	Free.	Albuminoids.	Nitrates.	Nitrites.				
9478	1911 Oct. 10	None	None	None	0.05	.....	....	.0010	.0010	.0050	.0000	0.08	0.4	....	..

Examination of Water from Well of L. E. Hayward.

9240	1911 Aug. 7	None	V. slight	V.slight	0.00	.....	....	.0005	.0010	.0050	.0000	.03	1.2	....	..

Examination of Water from Well of Free Baptist Society.

9657	1911 Dec. 28	Mod. opal	Mod. coarse	Aromatic	0.05	.....	....	.0010	.0025	.0050	.0000	3.20	6.0	....	*

* B. coli present.

Examination of Water from Well of Laconia Car Company.

9433	1911 Sept.25	H. opal	H. earthy	None	0.05	.....	....	High	.0025	.0300	High	2.00	6.0	....	*
9463	Sept.29	Sl. opal	Mod. earthy	Slight earthy	0.08	.....	....	High	.0025	.0750	High	4.30	6.7	....	..

* B. coli present.

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Lancaster.—The Precinct supply, installed in 1891, is derived from a mountain stream, from which it flows to a reservoir of 2,000,000 gallons. Four hundred and sixty families, 98 per cent. of the population are served.

Examination of Water Supply of Lancaster.

Number.	Date of collection.	Appearance				Residue on Evapo'n		Ammonia		Nitrogen as		Chlorine.	Hardness.	Lead.	
		Turbidity.	Sediment.	Odor.	Color.	Total.	Fixed.	Free.	Albuminoid	Nitrates.	Nitrites.				
4486	1907 Apr. 30	V. S. opal	V. slight	None	0.20	3.2	2.0	.0004	.0060	.0100	.0000	.07	1.2	....	..
4985	Oct. 28	None	V. slight	None	0.20	3.3	2.5	.0016	.0030	.0200	.0000	.10	1.2	....	..
7810	1910 Apr. 14	None	None	Sl. swampy	0.30	5.3	3.5	.0032	.0025	.0040	.0001	.07	.6	....	..
8846	1911 May 3	V. slight	None	None	0.25	2.8	1.9	.0015	.0050	.0050	.0000	.07	0.6	....	..
9872	1912 Apr. 29	None	None	Sl. earthy	0.15	2.8	1.0	.0010	.0040	.0025	.0000	.06	0.1	....	..

Examination of Ice used by the Lancaster House.

9735	1912 Feb. —	V. slight	Mod. gelat.	Sl. veg.	0.00	.....	....	.0005	.0020	.0005	.0000	.03	0.0	....	..

Lebanon.—The Fire Precinct supply, established in 1897, is derived from the Mascoma River. During 1907 a mechanical filter plant was installed and the river water, after a preliminary sedimentation and treatment with coagulant, is passed through these filters before pumping to the reservoir.

A spring, known as the Kendrick & Davis supply, is also used to some extent. The village of West Lebanon is furnished with water supplied by the Hartford Water Company, White River Junction, Vt.

Of thirteen samples representing private sources five were found to be pure and seven were condemned because of excess of lead.

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Examination of Water from the Lebanon Supply.

Number.	Date of collection.	Appearance				Residue on Evapo'n		Ammonia		Nitrogen as		Chlorine.	Hardness.	Lead.	
		Turbidity.	Sediment.	Odor.	Color.	Total.	Fixed.	Free.	Albuminoid	Nitrates.	Nitrites.				
5231	1908 Apr. 13	None	None	None	0.00	3.2	1.4	.0006	.0028	.0040	.0000	.09	1.2	....	..
5232	Apr. 13	None	V. slight	V.slight	0.30	3.6	2.2	.0042	.0068	.0100	.0000	.09	1.0	....	*
5276	May 6	None	V. slight	Sl. arom.	0.05	5.3	4.2	.0006	.0038	.0080	.0000	.15	1.6	....	..
5462	July 23	None	None	Slight	0.05	3.3	2.8	.0004	.0008	.0020	.0000	.10	1.2	....	..
5757	Oct. 14	None	None	None	0.05	3.5	....	.0032	.0045	.0100	.0000	.04	3.2	....	..
5964	1909 Feb. 2	None	None	V.slight	0.10	4.7	2.5	.0020	.0040	.0080	.0000	.11	1.6	....	..
6040	Mar.18	S. opal	None	None	0.30	.....	....	.0008	.0025	.0050	.0000	.14	1.8	....	*
7144	June 28	None	None	None	0.00	4.9	2.5	.0015	.0050	.0000	.0000	.15	1.5	....	..
7797	1910 Apr. 13	V. slight	V. slight	Earthy	0.20	4.3	2.7	.0030	.0090	.0020	.0000	.08	4.4	....	..
7931	June 1	V. slight	None	Earthy	0.10	4.4	2.9	.0010	.0060	.0025	.0000	.10	4.9	....	..
7932	June 1	V.ft.opal	S.earthy	None	0.10	4.9	2.9	.0010	.0040	.0050	.0000	.12	2.9	....	..
8842	1911 May 3	None	None	None	0.05	4.1	3.0	.0010	.0030	.0025	.0000	.10	1.5	....	..
9886	1912 May 3	V. slight	None	None	0.05	4.1	2.8	.0006	.0035	.0025	.0000	.11	1.5	....	..

* B. coli present.

Examination of Water Supplied West Lebanon by Hartford Water Company, White River Junction, Vt.

3804	1906 July 31	None	None	S. veg.	0.1	7.0	4.0	.0018	.0080	.0500	.0000	.15	....	....	..
5493	1908 Aug. 11	M. opal	V. slight	Veg.	0.15	5.8	3.8	.0010	.0030	.0050	.0000	.07	2.6	....	..
5498	Aug. 11	M. opal	V. slight	Veg.	0.17	5.5	3.2	.0010	.0050	.0070	.0000	.06	1.2	....	..
5887	Dec. 14	None	Sl. floc.	Sl. fishy	0.00	8.5	6.2	.0040	.0020	.2000	Trace	.25	3.2	....	[1]
5961	1909 Feb. 2	None	None	None	0.00	5.7	4.2	.0015	.0005	.1200	.0000	.12	2.3	....	..

[1] Sikes Springs.

Examination of Ice from Mascoma River.

9246	1911 Aug. —	None	V. sl. floc.	None	0.00	.....	....	.0004	.0005	.0025	.0000	.01	0.0	....	..
9317	Aug. 28	V. sl. opal	Slight	V. sl. earthy	0.00	.....	....	.0005	.0010	.0025	.0000	.01	0.0	....	..

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Examination of Water from the Wells of L. Florence Wood, West Lebanon.

Number.	Date of collection.	Appearance				Residue on Evapo'n		Ammonia		Nitrogen as		Chlorine.	Hardness.	Lead.	
		Turbidity.	Sediment.	Odor.	Color.	Total.	Fixed.	Free.	Albuminoid.	Nitrates.	Nitrites.				
9260	1911 Aug. —	V. slight	None	V. sl. foul	0.00	.....	....	.0010	.0015	.0050	.0000	.10	4.6	....	[1]
9261	Aug. —	None	None	None	0.00	.....	....	.0010	.0015	.0050	.0000	.15	3.2	....	[2]

[1] South well. [2] North well.

Examination of Water from Stream Supplying Water to B. & M. R. R.

8422	1910 Sept.15	None	None	None	0.00	.....	....	.0010	.0005	.1700	.0000	.85	8.9	....	..

Lincoln.—The village is served with a gravity supply taken from a stream, installed in 1903 by J. E. Henry & Sons Company.

Examination of Water from Henry Supply.

Number.	Date of collection.	Appearance				Residue on Evapo'n		Ammonia		Nitrogen as		Chlorine.	Hardness.	Lead.	
		Turbidity.	Sediment.	Odor.	Color.	Total.	Fixed.	Free.	Albuminoid	Nitrates.	Nitrites.				
5338	1908 June 2	V. slight	V. slight	None	0.12	.....	....	.0006	.0014	.0030	.0000	.06	0.4	....	..
7794	1910 Apr. 13	None	V. slight	Earthy	0.05	2.2	1.2	.0018	.0050	.0030	.0000	.05	0.4	....	..
8844	1911 May 3	None	None	None	0.10	2.4	1.5	.0005	.0020	.0025	.0000	.05	0.4	....	..
9904	1912 May 9	None	None	Sl. earthy	0.15	2.6	1.6	.0005	.0050	.0050	.0000	.05	0.4	....	..

Lisbon.—The Lisbon Water Works, owned by a private company and installed in 1887, are supplied from a pond fed by springs. This is a gravity system, the reservoir having a capacity of 1,000,000 gallons. The mains are of wrought iron, six miles, and the service pipes are the same. About three hundred families, 90 per cent. of the population, are takers.

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Examination of Water from the Lisbon Supply.

Number.	Date of collection.	Appearance				Residue on Evapo'n		Ammonia		Nitrogen as		Chlorine.	Hardness.	Lead.	
		Turbidity.	Sediment.	Odor.	Color.	Total.	Fixed.	Free.	Albuminoid	Nitrates.	Nitrites.				
5154	1908 Mar. 2	None	None	Earthy	0.20	3.5	2.5	.0010	.0036	.0060	.0000	.10	1.9	....	..
5185	Mar. 24	M'd'ate slight	Consid. earthy	Mark. earthy	0.20	4.0	2.5	.0026	.0084	.0040	.0000	.12	1.9	....	..
5316	May 22	M'd'ate	Consid. earthy	Mark. earthy	0.20	6.2	4.5	.0012	.0074	.0030	.0000	.08	2.5	....	..
5901	Dec. 23	None	None	None	0.00	.....	....	.0015	.0030	.0100	.0000	.10	2.4	....	..
7795	1910 Apr. 13	V.slight	Slight	Mark. veg.	0.15	4.6	2.0	.0014	.0130	.0050	.0000	.09	1.2	....	..
8816	1911 Apr. 24	None	Sl. fibre	Foreign	0.08	4.7	2.2	.0025	.0070	.0050	.0000	.07	1.2	....	..
8985	June 15	V.slight	Sl. earthy	Sl. veg.	0.30	.....	....	.0030	.0060	.0050	.0000	.08	2.6	....	..
10002	1912 June 5	Slight	Moderate	Sl. earthy	0.25	3.4	2.0	.0010	.0025	.0050	.0000	.06	1.5	....	..

Examination of Water, Source of Ice Supply of the Bowles & Hoskins Co.

8526	1910 Nov. 5	V.slight	Slight	Sl. marshy	0.35	.....	....	.0040	.0140	.0100	.0000	.50	2.6	....	[1]
8530	Nov. 5	V.slight	V. slight	None	0.60	.....	....	.0040	.0110	.0050	.0000	.15	1.9	....	[1]
8531	Nov. 5	V.slight	Sl. veg.	Sl. marshy	0.50	.....	....	.0020	.0020	.0050	.0000	.20	1.9	....	*[1]
8571	Dec. 5	None	V. slight	Sl. musty	0.20	.....	....	.0070	.0060	.0150	.0000	.05	2.0	....	[2]

* B. coli present. [1] Old supply. [2] Proposed new supply.

Examination of Water from Spring of C. E. Noyes.

8527	1910 Nov. 5	None	None	V. sl. foul	0.05	.....	....	.0050	.0020	.0500	.0000	.30	4.6	.025	..

Examination of Water from Spring of J. W. Fobes.

10306	1912 July 31	None	None	None	0.00	.....	....	.0005	.0005	.0050	.0000	.05	1.4	....	..

Examination of Cesspool Effluent, forwarded from Sugar Hill.

10022	1912 June 8	H. opalesc.	Mod. organic	Marked foul	0.35	.....	....	Very high	High	.0050	.0000	.95	1.8	....	*

* B. coli present.

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Littleton.—The town of Littleton derives its supply from the north branch of Gale River, the intake of which is at the base of Mt. Garfield. The main pipe, 19 miles long, is 16 inches in diameter for a short distance from the intake; 12 inches for the next five miles; and 10 inches for the remainder of the distance. There are two reservoirs, of 1,000,000 and 500,000 gallons' capacity.

Examination of Water from the Littleton Supply.

Number.	Date of collection.	Appearance				Residue on Evapo'n		Ammonia		Nitrogen as		Chlorine.	Hardness.	Lead.	
		Turbidity.	Sediment.	Odor.	Color.	Total.	Fixed.	Free.	Albuminoid	Nitrates.	Nitrites.				
5415	1908 July 9	None	S. fine	None	0.10	2.2	1.3	.0006	.0022	.C060	.0000	.06	0.3	....	..
7536	1909 Dec. 2	None	None	None	0.00	3.0	1.6	.0008	.0020	.0100	.0000	.08	0.4	....	..
7800	1910 Apr. 12	None	V. slight	Sl. earthy	0.10	2.1	1.2	.0012	.0039	.0020	.0000	.07	0.1		
8851	1911 May 9	None	V. slight	None	0.10	2.2	1.1	.0010	.0020	.0100	.0000	.06	0.1	....	..
9893	1912 May 6	None	V. slight	None	0.09	1.2	0.7	.0010	.0015	.0025	.0000	.04	0.1	....	..

Examination of Water from Supplies Owned by Littleton Union School District.

9420	1911 Sept 15	None	V. slight	None	0.05	.....	....	.0014	.0004	.0100	High	.60	5.0	Hi'h	*1
9421	Sept 15	V. slight	Sl. silty	None	0.05	4.8	2.9	.0004	.0006	.0020	.0000	.08	1.9	....	2

* B. Coli present; [1] Spring; [2] Well.

Londonderry.

Examination of Water from the Wells of E. C. Chase.

9294	1911 Aug. 15	None	V. slight	None	0.05	.....	....	.0020	.0015	.0100	.0000	0.40	1.9	....	*
9295	Aug. 15	None	Slight	Foreign	0.05	.....	....	Very high	0045	.0100	.0000	3.90	3.9	Hi'h	*
9405	Sept.15	None	None	Sl. musty	0.05	20.8	10.4	.0024	.0026	.0200	Trace	3.40	6.7	.03	..

* B. coli present.

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Lyme.—In 1838 the Lyme Aqueduct Company inaugurated a system of water works, the source being springs.

Examination of Water from Supply of Lyme Aqueduct Company.

Number.	Date of collection.	Appearance				Residue on Evapo'n		Ammonia		Nitrogen as		Chlorine.	Hardness.	Lead.	
		Turbidity.	Sediment.	Odor.	Color.	Total.	Fixed.	Free.	Albuminoid	Nitrates.	Nitrites				
4586	1907 May 30	None	V. slight	None	0.00	6.8	5.3	.0004	.0022	.0050	.0000	.11	3.9	.....	..
5007	Nov. 11	None	None	None	0.00	6.8	6.1	.0018	.0024	.0040	.0000	.19	3.9	.....	..
5323	1908 May 26	V. ft. op.	V. S. fibr.	Mark. stale	0.00	6.9	5.1	.0010	.0006	.0050	.0000	.10	3.9	.....	*
7802	1910 Apr. 14	None	V. S. fibr.	Mark. veg.	0.10	.....	.....	.0015	.0030	.0040	.0000	.39	2.4	.010	..
8862	1911 May 8	None	None	None	0.05	5.3	3.2	.0020	.0015	.0025	.0000	.12	2.7	.000	..
9891	1912 May 6	None	None	None	0.05	4.2	2.3	.0010	.0015	.0025	.0000	.07	2.0	.010	..

* B. coli present.

Examination of Water from Well of A. H. Derby.

8933	1911 May 31	Slight	Sl. gelat.	Mark. veg.	0.20	.....	.....	.0120	High	.0500	High	.35	3.9	.....	..

Lyndeborough.

Examination of Water from Spring of Margaret Mc Kittrick.

Number.	Date of collection.	Appearance				Residue on Evapo'n		Ammonia		Nitrogen as		Chlorine.	Hardness.	Lead.	
		Turbidity.	Sediment.	Odor.	Color.	Total.	Fixed.	Free.	Albuminoid	Nitrates.	Nitrites.				
8429	1910 Sept 9	None	None	None	0.00	.....	.....	.0005	.0010	.0050	.0000	.15	1.2	.....	..

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Madbury.

Examination of Water from Well of B. & M. R. R.

Number.	Date of collection.	Appearance				Residue on Evapo'n		Ammonia		Nitrogen as		Chlorine.	Hardness.	Lead.	
		Turbidity.	Sediment.	Odor.	Color.	Total.	Fixed.	Free.	Albuminoid	Nitrates.	Nitrites.				
9664	1912 Jan. 3	Sl. opal	V. slight	None	0.05	.....	....	.0010	.0015	.0250	.0000	.80	.86	....	*

* B. Coli present.

Madison.—No regular supply system. Water is furnished to about 25 families through extensions from four private spring and well supplies, owned respectively by W. K. Forrest, John Chick, Edgar Burke and Gilman Lyman.

Examination of Water from John F. Chick Supply.

Number.	Date of collection.	Appearance				Residue on Evapo'n		Ammonia		Nitrogen as		Chlorine.	Hardness.	Lead.	
		Turbidity.	Sediment.	Odor.	Color.	Total.	Fixed.	Free.	Albuminoid	Nitrates.	Nitrites.				
5496	1908 Aug. 11	None	None	None	0.00	4.9	3.0	.0008	.0006	.0150	.0000	.07	2.6	....	..
5497	Aug. 11	None	None	None	0.05	3.3	2.0	.0005	.0000	.0150	.0000	.07	0.9	....	..
7466	1909 Oct. 21	None	None	None	0.00	4.5	....	.0015	.0015	.0300	.0000	.08	1.2	....	..
8422	1911 Mar. 6	None	V. slight	None	0.00	.....	.....	.0010	.0010	.0025	.0000	.03	1.2	....	..
8913	May 24	V. slight	V. slight	None	0.05	4.4	3.3	.0015	.0010	.0050	.0000	.10	2.5	....	..

Manchester.—A water supply was instituted by the city in 1873, was added to in 1886, and supplemented by a high service in 1894. The source is Lake Massabesic, having an area of 2,500 acres, an average depth of 20 feet, and a bottom partly rocky and partly muddy. It has approximately 40 miles of watershed, wooded and cleared about equally. The water is pumped to a reservoir of 15,000,000 gallons' capacity, and an average depth of 20 feet; low service by gravity;

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high service by steam; 4,000,000-gallon reservoir. There are 110 miles of distributing mains, iron; service pipes are iron, lead lined. The average daily consumption is 3,500,000 gallons; 13,000 families, 99 per cent. of the population, are consumers of this water.

Examination of Water from Lake Massabesic.

Number.	Date of collection.	Appearance				Residue on Evapo'n		Ammonia		Nitrogen as		Chlorine.	Hardness.	Lead.	
		Turbidity.	Sediment.	Odor.	Color.	Total.	Fixed.	Free.	Albuminoid	Nitrates.	Nitrites.				
	1908														
5604	Sept. 8	Slight	Sl. fine	Sl. earthy	0.20	6.3	3.2	.0004	.0064	.0020	.0000	.15	0.6	....	..
5605	Sept. 8	Slight	Sl. fine	None	0.20	5.7	3.8	.0002	.0058	.0050	.0000	.16	0.3	....	..
5606	Sept. 8	V. slight	Slight	None	0.20	5.0	4.5	.0002	.0062	.0050	.0000	.28	0.3	....	..
5607	Sept. 8	Slight	Sl. fine	None	0.20	3.4	1.2	.0002	.0066	.0050	.0000	.18	0.4	....	..
5608	Sept. 8	V. slight	Slight	Earthy	0.15	3.8	1.0	.0002	.0050	.0060	.0020	.16	0.3	....	..
5609	Sept. 8	None	None	None	0.30	5.3	2.8	.0002	.0032	.0040	.0000	.14	0.4	....	*
5654	Sept.21	None	V. slight	None	0.20	4.5	2.7	.0008	.0076	.0030	.0000	.18	0.4	....	..
5653	Sept.21	None	V. slight	None	0.20	3.7	2.0	.0004	.0060	.0030	.0000	.20	0.4	....	..
5732	Oct. 7	None	Slight	None	0.25	3.0	1.6	.0026	.0050	.0050	.0000	.18	0.1	....	..
5733	Oct. 7	Marked	Con.	None	0.50	3.0	1.8	.0010	.0100	.0080	.0000	.16	0.1	....	..
	1909														
7524	Dec. 1	None	None	None	0.20	3.7	1.5	.0008	.0085	.0050	.0000	.20	0.4	....	..
7527	Dec. 1	V. slight	Sl. floc.	None	0.70	12.0	5.0	.0010	High	.0400	.0000	.80	3.2	....	..
7529	Dec. 1	V. slight	V. slight	Sl. swamp.	0.60	6.5	3.2	.0010	.0140	.0050	.0000	.25	1.2	....	..
7530	Dec. 1	V. slight	V. slight	Sl. swamp.	0.70	7.5	3.5	.0010	High	.0050	.0000	.30	1.9	....	..
	1910														
8543	Nov.14	V. slight	V. slight	None	0.10	2.8	0.8	.0010	.0090	.0025	.0000	.10	0.4	.050	..
	1911														
8673	Jan. 30	Slight	Slight	None	0.20	3.2	1.7	.0020	.0080	.0025	.0000	.23	0.7	.075	*
9028	June 26	V. slight	Sl. fine	Sl. foul	0.20	13.0	8.3	.0105	.0130	.0050	.0000	.22	0.4	....	*
9415	Sept.15	V. slight	V. slight	Sl. earthy	0.10	2.6	1.0	.0004	.0076	.0060	.0000	.22	0.3	....	..
	1912														
9772	Mar.18	Slight	Slight	Sl. marshy	0.35	3.8	1.5	.0020	.0120	.0050	.0000	.23	0.3	....	..
9961	May 23	V. Sl. opal	Sl. coarse	Sl. swampy	2.40	4.8	2.6	.0010	.0070	.0050	.0000	.18	0.3	....	*

* B. Coli present.

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Examination of Water from Lake Massabesic.—Concluded.

Number.	Date of collection.	Appearance				Residue on Evapo'n		Ammonia		Nitrogen as		Chlorine.	Hardness.	Lead.	
		Turbidity.	Sediment.	Odor.	Color.	Total.	Fixed.	Free.	Albuminoid	Nitrates.	Nitrites.				
9962	1912 May 23	Slight	Mod. gelat.	Sl. Barn-yard	0.25	4.1	2.5	.0010	.0060	.0050	.0000	.20	0.1	....	*
10263	July 24	Slight	Mod. gelat.	Dist. fatty	0.25	.....	....	.0010	.0010	.0025	.0000	.22	0.1	....	[1]

* B. coli present. [1] Emery Brook, 100 feet from Lake.

Examination of Water from Well of W. H. McElwain Company.

8522	1910 Nov. 7	V.slight	V. slight	None	.05	.....	....	.0010	.0025	.2250	Trace	.35	7.4	....	..

Examination of Water from Supplies Owned by the Devonshire Mills.

8464	1910 Oct. 3	None	None	Sl. musty	0.05	.....	....	.0116	.0020	.0200	.0000	1.35	4.6	.050	..
8659	1911 Jan. 23	V.slight	V. slight	Sl. earthy	0.00	.....	....	.0035	.0030	.1250	.0000	2.00	4.6	.025	*
8699	Feb. 16	V.slight	Mod. earthy	None	0.08	.....	....	.0010	.0020	.2500	.0000	1.80	5.3	....	..
8731	Mar. 7	None	V. slight	Sl. earthy	0.00	.....	....	.0020	.0040	.2500	.0000	2.50	4.6	....	..

* B. coli present.

Examination of Water from Spring of the Amoskeag Mfg. Co.

9402	1911 Sept. 7	None	None	None	0.00	14.4	9.9	.0002	.0002	.0150	.0000	1.60	5.7	....	..

Examination of Water from Spring of George H. Brown.

9449	1911 Sept. 25	None	None	Sl. earthy	0.00	.....	....	.0005	.0010	.0025	.0000	0.10	1.9	....	..

Examination of Water from Well of W. H. Coburn.

8785	1911 July 19	None	V. slight	None	0.05	.....	....	.0040	.0030	.0100	Sl. trace	0.12	1.9	....	..

Examination of Water from Spring of Timothy Shine.

8872	1911 May 12	None	Sl. veg.	Mark. foul	0.10	.....	....	.0020	.0040	.2500	Very high	1.90	4.6	....	*

* B. coli present.

Examination of Water from Spring of B. & M. R. R.

9235	1911 Aug. 8	V. slight	V. slight	None	No'e	.....	....	.0010	.0015	.0200	.0000	0.30	1.1	.012	..

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Marlborough.

Examination of Water from Spring of Collins & Richardson.

Number.	Date of collection.	Appearance				Residue on Evapo'n		Ammonia		Nitrogen as		Chlorine.	Hardness.	Lead.	
		Turbidity.	Sediment.	Odor.	Color.	Total.	Fixed.	Free.	Albuminoid	Nitrates.	Nitrites.				
9720	1912 Feb. 15	None	Slight	Pecu-liar	0.00	.....	....	.0015	.0010	.0100	.0000	.10	1.2	.050	..

Examination of Water from the Spring of C. S. Movis.

9758	1912 Mar. 4	None	V. slight	None	0.00	.....	....	.0010	.0010	.0025	.0000	.05	0.4	.025	..

Examination of Water from Well of Miss Lilla Knowlton.

9140	1911 July 20	V. slight	Sl. sandy	None	0.05	.....	....	.0010	.0015	.0150	.0000	.40	2.0	Hi'h	..

Examination of Water from Well of the Congregational Church.

8406	1910 Sept. 8	V. slight	None	V.slight	0.00	.....	....	.0012	.0004	.0025	.0000	.50	2.8	....	..

Meredith.—The supply of the Meredith Fire District consists of springs and a stream, the water from which is collected by gravity flow in a reservoir formed upon a side hill through the construction of an embankment upon the lower side, giving an elevation of 175 feet above the village. Two hundred families, 85 per cent. of the population, are supplied.

During the summer of 1912, some odor and taste developed in this supply and a report was circulated to the effect that such had been infected by typhoid. An investigation showed that there was no basis for the latter. While the trouble complained of was of temporary character and of no serious significance, the Board of Commissioners was advised to have the reservoir drained and cleaned at a favorable opportunity.

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Examination of Water from Supply of the Meredith Fire District.

Number.	Date of collection.	Appearance				Residue on Evapo'n		Ammonia		Nitrogen as		Chlorine.	Hardness.	Lead.	
		Turbidity.	Sediment.	Odor.	Color.	Total.	Fixed.	Free.	Albuminoid.	Nitrates.	Nitrites.				
4513	1907 May 8	None	V. slight	None	0.10	2.6	1.8	.0012	.0030	.0050	.0000	.17	0.4	.03	..
5013	Nov.12	V.slight	V. slight	None	0.25	2.9	1.8	.0002	.0054	.0050	.0000	.32	1.2	....	..
7553	1909 Dec. 13	V.slight	V. slight	None	0.10	3.2	1.6	.0008	.0070	.0050	.0000	.20	1.9	....	..
8843	1911 May 3	None	None	None	0.05	3.1	2.6	.0015	.0030	.0050	.0000	.18	0.6	....	..
9158	July 26	Sl. opal	Sl.earthy	None	0.08	4.5	3.0	.0010	.0085	.0150	.0000	.20	0.7	....	..
9894	1912 May 6	Sl. opal	None	None	0.05	3.0	2.0	.0010	.0015	.0050	.0000	.20	0.4	....	..
10146	July 11	Mod. opal	V. slight	Earthy	0.07	.....	....	.0010	.0010	.0025	.0000	.10	0.4	....	*
10147	July 11	Sl. opal	V. slight	Earthy	0.05	.....	....	.0010	.0040	.0025	.0000	.10	0.4	....	..

* B. coli present.

Examination of Water from the Spring of John M. Neil.

10327	1912 Aug. 5	V.slight	Mod. coarse	Sl. earthy	0.00	.....	....	.0005	.0020	.0005	.0000	0.8	2.7	....	..

Examination of Water from the Spring of A. F. Hall.

10299	1912 July 30	None	V. slight	V.slight	0.00	.....	....	.0005	.0010	.0025	.0000	.10	3.9	.010	..

Merrimack.—A supply instituted in 1912 by the United Realty Company has its source in a stream. The water is pumped to a reservoir and supplies 45 families, 70 per cent. of the population.

Examination of Water from Driven Well of W. H. McElwain Company.

Number.	Date of collection.	Appearance				Residue on Evapo'n		Ammonia		Nitrogen as		Chlorine.	Hardness.	Lead.	
		Turbidity.	Sediment.	Odor.	Color.	Total.	Fixed.	Free.	Albuminoid	Nitrates.	Nitrites.				
8407	1910 Sept. 9	Mod.	Mod. ferrug.	Sl. earthy	0.60	6.0	4.2	High	.0010	.0050	.0000	.39	2.3	....	..
8418	Sept.12	Heavy	Con. ferrug.	Sl. earthy	0.70	4.9	2.8	High	.0020	.0025	.0000	.20	1.2	....	..

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Milford.—The public water works of Milford were built in 1890 by John T. Langford and purchased by the town in 1891. There are three collecting wells, two of them about 35 feet in diameter and one 20 feet deep; one somewhat smaller is fed by driven pipes. Soil, gravel with clay bottom. The water is pumped to a standpipe of 250,000 gallons' capacity.

Examination of Water from Faucet of Milford Water Supply.

Number.	Date of collection.	Appearance				Residue on Evapo'n		Ammonia		Nitrogen as		Chlorine.	Hardness.	Lead.	
		Turbidity.	Sediment.	Odor.	Color.	Total.	Fixed.	Free.	Albuminoid	Nitrates.	Nitrites.				
5307	1908 May 20	None	None	None	0.10	5.8	2.3	.0002	.0024	.0050	.0000	.12	0.9	....	..
5659	Sept.21	Mod. op	Slight	Gas	1.30	7.7	5.6	.0004	.0036	.0040	.0000	.25	2.8	....	..
5660	Sept.21	Mod. op.	Slight	M'ked gas	0.80	.....	....	.0002	.0030	.0030	.0000	.20	3.9	....	..
5661	Sept.21	S. op.	V. slight	None	0.40	6.0	4.3	.0014	.0006	.0050	.0000	.20	1.8	....	..
5785	Oct. 21	None	None	None	0.20	3.5	2.1	.0010	.0020	.0000	.0000	.17	0.9	....	..
7549	1909 Dec. 8	V. slight	Slight	None	0.05	3.9	1.7	.0001	.0012	.0100	.0000	.18	1.2	....	..
7821	1910 Apr. 21	None	None	None	0.10	3.9	2.3	.0005	.0070	.0100	.0000	.35	0.9	....	*
7893	May 17	Cons.	V. heavy ferrug.	Veg.	0.10	5.1	3.1	.0010	.0010	.0025	.0000	.30	1.4	....	*
7894	May 17	None	Sl.earthy	Earthy	0.20	4.0	2.4	.0010	.0070	.0050	.0000	.30	1.6	....	..
7895	May 17	Slight	Sl. fibre	Earthy	0.20	3.6	2.8	.0010	.0040	.0100	.0000	.30	1.2	....	..
7896	May 17	V. slight	Sl. floc.	Earthy	0.50	4.0	2.2	.0030	.0095	.0050	.0000	.30	1.9	....	..
7936	June 3	None	None	None	0.00	3.0	2.0	.0010	.0010	.0100	.0000	.30	1.2	....	..
8849	1911 May 4	Mod. opal	Sl. earthy	Earthy	0.40	3.9	2.5	.0015	.0030	.0050	.0000	.20	1.4	....	..
9892	1912 May 6	None	V. slight	None	0.15	3.0	1.8	.0020	.0015	.0050	.0000	.13	0.6	....	..

* B. coli present.

Nashua.—The Pennichuck Water Works, installed in 1853, furnishes water from springs and wells. There is also a large secondary supply consisting of ponds. The water is pumped to a reservoir of 4,000,000 gallons' capacity; average daily pumpage 2,750,000 gallons. (For a special illustrated description of this supply see elsewhere.)

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Examination of Water from Supply of Pennichuck Water Works.

Number.	Date of collection.	Appearance				Residue on Evapo'n.		Ammonia		Nitrogen as		Lead.	Hardness.	Chlorine.	
		Turbidity.	Sediment.	Odor.	Color.	Total.	Fixed.	Free.	Albuminoid	Nitrates.	Nitrites.				
3445	1906 Feb. 6	None	None	Veg.	0.10	3.7	2.7	.0008	.0030	.0050	.0000	.22	2.0	....	..
3820	Aug. 7	V.slight	V. slight	Veg.	0.03	6.0	5.0	.0010	.0064	.0050	.0000	.20	1.4	....	..
4178	Nov.23	None	None	Earthy	0.05	5.0	4.0	.0010	.0054	.0050	.0000	.25	1.9	....	..
4294	1907 Jan. 24	None	None	None	0.00	.....	....	.0010	.0006	.0000	.0000	.07	2.7	....	..
5025	Nov.15	None	None	Earthy	0.10	3.9	3.3	.0008	.0024	.0020	.0000	.23	1.9	....	..
5117	1908 Jan. 21	None	None	None	0.00	3.3	2.7	.0008	.0008	.0060	.0000	.21	2.5	....	..
5915	Dec. 30	Ft. op.	None	None	0.00	.....	....	.0005	.0015	.0000	.0000	.18	1.2	....	..
6008	1909 Mar.13	None	None	Sl. earthy	0.10	3.1	2.0	.0010	.0035	.0100	.0000	.18	1.4	....	..
7857	1910 May 2	V.slight	Mod.veg	Sl. swamp	0.70	4.0	2.0	.0035	.0100	.0020	.0000	.30	2.0	.025	[1]
8943	1911 June 1	V.slight	Sl. earthy	Sl.veg.	0.05	4.7	3.3	.0010	.0015	.0050	.0000	.10	1.9	....	..
10010	1912 June 7	V.slight	Slight	Sl.veg.	0.06	4.5	3.3	.0010	.0020	.0050	.0000	.10	1.9	....	..

[1] Secondary supply. Pond being cleaned.

Examination of Water from Well of Nashua Shearer Company.

8499	1910 Oct. 24	V. sl. opal	V. slight	None	0.00	.....	....	.0020	.0020	.0200	.0000	.45	2.0	N'n'	..

Examination of Water from Well of L. D. Fuller, Supplying four Families.

8456	1910 Sept.26	None	V. slight	None	0.00	.....	....	.0010	.0010	.0050	.0000	0.20	1.9	....	..

Examination of Water from [1] Pond Owned by George E. Balcom.

489	1909 Oct. 28	Sl. opal	Mod.floc	Arom.	0.30	.....	....	High	High	.0050	.0000	.40	0.4	....	..
10003	1912 June 5	H. opal	Consid. gelat.	Dist. sweet-ish	0.50	.....	....	.0010	.0090	.0050	.0000	.20	0.3	....	..

[1] Presumably Tarnic Pond, in town of Hudson.

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Newcastle.

Examination of Ice, Supply of Hotel Wentworth.

Number.	Date of collection.	Appearance				Residue on Evapo'n		Ammonia		Nitrogen as		Chlorine.	Hardness.	Lead.	
		Turbidity.	Sediment.	Odor.	Color.	Total.	Fixed.	Free.	Albuminoid	Nitrates.	Nitrites.				
8897	1911 May 23	None	V. slight	None	0.00	0.7	0.3	.0010	.0015	.0050	.0000	.08	0.0	....	..

Examination of Water from the Well of Ella Sturtevant.

10101	1912 June 27	V.slight	Slight	Sl. earthy	0.05	.....	....	.0080	.0020	.2250	High	92.0	12.4	....	..

Newfields.

Examination of Water from Well of Alfred Conner.

Number.	Date of collection.	Appearance				Residue on Evapo'n		Ammonia		Nitrogen as		Chlorine.	Hardness.	Lead.	
		Turbidity.	Sediment.	Odor.	Color.	Total.	Fixed.	Free.	Albuminoid	Nitrates.	Nitrites.				
8911	1911 May 25	V.slight	V. slight	None	0.05	.....	....	.0010	.0020	.0150	.0000	.65	4.6	....	..

New Hampton.—During 1910 the precinct inauguarated a supply, the source being Mountain Pond. The latter is a sheet of water of about 30 acres' area, 10 to 40 feet deep, situated at a considerable altitude about one mile from any habitation, and with no pasturage near pond, brook or reservoir. The distributing reservoir has a capacity of 5,000,000 gallons. About two miles of cast iron mains, with services of galvanized iron.

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Examination of Water from Mountain Pond.

Number.	Date of collection.	Appearance				Residue on Evapo'n		Ammonia		Nitrogen as		Chlorine.	Hardness.	Lead.	
		Turbidity.	Sediment.	Odor.	Color.	Total.	Fixed.	Free.	Albuminoid	Nitrates.	Nitrites.				
5277	1908 May 4	Slight	S. floc.	S. stale	0.15	3.5	1.9	.0016	.0044	.0030	.0000	.09	0.4	....	..
5278	May 4	Mod'ate	S. floc.	Slight	0.10	2.4	1.2	.0018	.0066	.0050	.0000	.09	0.4	....	..
5297	May 18	V.slight	S. floc.	None	0.15	2.5	1.3	.0006	.0024	.0050	.0000	.08	0.3	....	..
5495	Aug. 12	V. slight	V. slight	None	0.20	.....	....	.0005	.0113	.0050	.0000	....	....	....	..
5796	Oct. 23	None	V. slight	Slight	0.15	2.4	.3	.0020	.0090	.0000	.0000	.08	0.3	....	..
5884	Dec. 10	V. slight	V. slight	Sl. musty	0.10	2.9	1.5	.0040	.0100	.0000	.0000	.09	0.3	....	..
6012	1909 Mar. 1	V. faint	V. slight	Slight	0.10	2.7	1.4	.0060	.0070	.0050	.0000	.08	0.1	....	..
8874	1911 May 15	None	V. slight	Dist. veg.	0.15	2.7	1.7	.0010	.0040	.0050	.0000	.10	0.1	....	..
9923	1912 May 14	None	None	V.slight	0.10	2.3	1.2	.0010	.0025	.0050	.0000	.07	0.1	....	..

New Ipswich.

Examination of Water from Well Supplying School District.

Number.	Date of collection.	Appearance				Residue on Evapo'n		Ammonia		Nitrogen as		Chlorine.	Hardness.	Lead.	
		Turbidity.	Sediment.	Odor.	Color.	Total.	Fixed.	Free.	Albuminoid	Nitrates.	Nitrites.				
9576	1911 Nov.9	V. ft. opal	Sl. coarse	Sl. earth	0.00	.....	....	.0040	.0030	.1000	.0000	.95	1.9	....	..

New London.—The supply is from a private system owned by C. E. Shepard, consisting of two bored wells, 305 and 219 feet deep, respectively, the water being pumped to a reservoir of 30,000 gallons. One mile of galvanized iron mains with services of the same material. About 20 per cent. of the population is thus supplied, including Colby Academy, two stores, a hotel and ten families. Two or three familes are supplied by C. W. Converse with water pumped from Sunapee Lake.

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Examination of Water from Shepard Supply.

Number.	Date of collection.	Appearance				Residue on Evapo'n		Ammonia		Nitrogen as		Chlorine.	Hardness.	Lead.	
		Turbidity.	Sediment.	Odor.	Color.	Total.	Fixed.	Free.	Albuminoid.	Nitrates.	Nitrites.				
5922	1909 Jan. 4	None	V. slight	None	0.05	8.5	6.4	.0005	.0005	.0050	.0000	.09	2.9	....	..
7796	1910 Apr. 13	V.slight	V. slight	None	0.00	7.3	4.6	.0015	.0040	.0050	.0000	.35	2.9	....	..
7838	Apr. 25	V.slight	V. slight	Sl. earthy	0.05	7.3	6.7	.0015	.0010	.0050	.0000	.05	3.3	....	..
8905	1911 May 23	None	None	None	0.00	7.8	6.4	.0030	.0010	.0050	.0000	.05	2.9	....	..
9247	Aug. 7	Slight	Sl. coarse	Foreign	0.03	8.2	7.7	.0030	.0030	.0050	.0000	.05	2.9	....	..
10132	1912 July 10	None	None	None	0.05	7.5	5.0	.0010	.0010	.0050	.0000	.05	3.2	....	..

Newmarket.—The public water supply, owned by the town, was built in 1894. The water, from a stream, is pumped to a standpipe of 22,000 gallons' capacity. There are seven miles of cast iron distributing mains, and the service pipes are of galvanized iron. The average daily consumption is 150,000 gallons. About 90 per cent. of the population are supplied from this system.

Number.	Date of collection.	Appearance				Residue on Evapo'n		Ammonia		Nitrogen as		Chlorine.	Hardness.	Lead.	
		Turbidity.	Sediment.	Odor.	Color.	Total.	Fixed.	Free.	Albuminoid	Nitrates.	Nitrites.				
7351	1909 Sept.14	Mod. op.	Sl. fib'y	Mkd. earthy	0.30	10.0	6.5	.0010	.0060	.0050	.0000	.40	3.2	....	*
7356	Sept.14	None	V. slight	Sl. earthy	0.10	6.1	2.6	.0025	.0100	.0050	.0000	.40	1.5	....	..
7360	Sept.14	Mod. op.	Mod. earthy	Mkd. earthy	0.40	.....	....	.0015	.0065	.0050	.0000	.30	2.8	....	..
7817	1910 Apr. 20	Slight	None	Clayey	0.30	4.9	4.3	.0022	.0085	.0075	.0000	.40	1.4	....	*
8867	1911 May 11	Mod.	V. slight	None	0.30	5.5	3.9	.0010	.0060	.0050	.0000	.32	1.6	....	..
9913	1912 May 11	Mod. opal	V. slight	Ft. marsh	0.35	6.0	4.0	.0015	.0060	.0100	.0000	.20	1.4	....	..

* B. coli present.

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Newport.—The town owns and operates a gravity system of water works, installed in 1894, supplied from a pond of 66 acres; average depth about thirty feet; bottom largely sand and rock. The watershed is about four or five square miles, about two thirds wooded; three families reside thereon. There are eight miles of cast iron mains, with wrought iron, and cement-lined service pipes. Five hundred families take this water.

Examination of Water from Tap of Town Supply.

Number.	Date of collection.	Appearance				Residue on Evapo'n		Ammonia		Nitrogen as		Chlorine.	Hardness.	Lead.	
		Turbidity.	Sediment.	Odor.	Color.	Total.	Fixed.	Free.	Albuminoid	Nitrates.	Nitrites.				
4516	1907 May 8	None	V. slight	None	0.10	3.4	2.5	.0024	.0046	.0050	.0000	.13	0.09	....	..
5065	Dec. 6	None	None	None	0.20	4.2	2.7	.0012	.0074	.0120	.0000	.05	.04	....	..
5989	1909 Feb. 6	None	None	Sl. earthy	0.05	3.0	1.5	.0010	.0060	.0050	.0000	.09	.70	....	..
9135	1911 July 18	None	V. slight	None	0.08	3.2	2.2	.0010	.0055	.0025	.0000	.10	0.30	....	*

Examination of Water from Stream, Proposed Auxiliary Supply.

9136	1911 July 28	Slight	Sl. floc.	None	0.30	.....	....	.0010	.0045	.0050	.0000	.05	1.1	....	*

* B. coli present.

Northumberland.—Groveton Village Precinct incorporated a system of public water works in 1894, from streams. There are two watersheds, of wooded land mainly, with no inhabitants. The source of the supply is in the mountain-side, and the water flows by gravity through about four miles of cast iron mains; service pipes are of galvanized iron. The entire precinct is supplied from this system. There are two or three private wells within the radius of this supply.

Northumberland Falls is supplied by a private water company.

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Examination of Water from Groveton Village Supply.

Number.	Date of collection.	Appearance				Residue on Evapo'n		Ammonia		Nitrogen as		Chlorine.	Hardness.	Lead.	
		Turbidity.	Sediment.	Odor.	Color.	Total.	Fixed.	Free.	Albuminoid	Nitrates.	Nitrites.				
8875	1911 May 15	None	V. slight	None	0.05	2.9	2.1	.0005	.0020	.0100	.0000	.05	0.1	....	..
10321	1912 Aug. 2	None	None	None	0.00	3.9	2.9	.0005	.0010	.0100	.0000	.05	0.3	....	..

Northwood.

Examination of Water from Town Well.

Number.	Date of collection.	Appearance				Residue on Evapo'n		Ammonia		Nitrogen as		Chlorine.	Hardness.	Lead.	
		Turbidity.	Sediment.	Odor.	Color.	Total.	Fixed.	Free.	Albuminoid	Nitrates.	Nitrites.				
9033	1911 June 28	None	None	None	0.05	.....	....	.0020	.0020	.2000	Sl. trace	1.85	2.0	....	*

* B. coli present.

Nottingham.

Examination of Water from Spring of Mrs. Sarah Cove.

Number.	Date of collection.	Appearance				Residue on Evapo'n		Ammonia		Nitrogen as		Chlorine.	Hardness.	Lead.	
		Turbidity.	Sediment.	Odor.	Color.	Total.	Fixed.	Free.	Albuminoid	Nitrates.	Nitrites.				
9441	1911 Sept. 24	None	None	V. slight	0.00	.....	....	.0008	.0010	.0025	.0000	.03	1.1	....	..

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Orford.

Examination of Water from Town Well.

Number.	Date of collection.	Appearance				Residue on Evapo'n		Ammonia		Nitrogen as		Chlorine.	Hardness.	Lead.	
		Turbidity.	Sediment.	Odor.	Color.	Total.	Fixed.	Free.	Albuminoid	Nitrates.	Nitrites.				
8481	1910 Oct. 11	Slight	Mod. ferrug.	Sl. veg.	0.10	.....	....	.0010	.0010	.0025	.0000	.10	3.2	....	..
9482	1911 Oct. 16	None	V. slight	V. sl. foul	0.05	15.3	10.5	.0020	.0010	.0750	.0000	.25	6.7	....	..

Ossipee.—Pursuant to an Act of the General Court, during 1911 the Ossipee Water & Electric Company instituted a gravity supply from Dan Hole ponds. On order to reduce pressure, a distributing reservoir of 1,000,000 gallons was constructed on the river of this name at a point one and one-half miles below the ponds. This affords a pressure of 133 pounds at the lower village. About five miles of mains, with galvanized iron services. It is expected that by the close of the year, the entire population (about 100 families) will be supplied from this source.

Examination of Water from the Supply of the Ossipee Water & Electric Company.

Number.	Date of collection.	Appearance				Residue on Evapo'n		Ammonia		Nitrogen as		Chlorine.	Hardness.	Lead.	
		Turbidity.	Sediment.	Odor.	Color.	Total.	Fixed.	Free.	Albuminoid	Nitrates.	Nitrites.				
9045	1911 July 13	None	Sl. veg.	Ft. earthy	0.05	2.8	0.8	.0005	.0025	.0050	.0000	.03	0.0	....	..
9748	1912 Feb. 27	None	None	None	0.02	.....	....	.0005	.0025	.0025	.0000	.05	1.6	....	..

Pembroke.—There are two private supplies. The Suncook Water Works, built in 1896, are supplied from a pond having an area of 25 acres, and located eight miles from the village; no inhabitants within two or three miles. The water, which flows by gravity, is taken from a collecting reservoir, located five miles from town and formed by the damming of a brook flowing from the pond. The area flowed has become swamp-like in character, none of the surface growth having been

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removed, and as a result, this supply is the most highly colored in the state. In addition, during 1910–11 water was pumped directly from the Suncook River, which is sewage-polluted. There are nine miles of distributing mains, cast iron; service pipe of galvanized iron. About 50 per cent. of the population is supplied from this source.

The Baker & Dearborn Water Works were built in 1895, the source being a spring and Suncook River. The river water is pumped to three reservoirs, 150 x 20, 50 x 20, and 50 x 20, and nine feet deep, respectively. These are so situated that the water seeps through a sand stratum before reaching the reservoir used for distribution. The distributing main is one mile in length and is of wrought iron; service pipes of galvanized iron. About 10 per cent. of the population take from this supply.

A proposition for a town system to supply the villages of Pembroke and Suncook with water from Brag Pond and the Soucook River, is expected to materialize in the near future.

Examination of Water from Taps, Suncook Water Works.

Number.	Date of collection.	Appearance				Residue on Evapo'n		Ammonia		Nitrogen as		Chlorine.	Hardness.	Lead.	
		Turbidity.	Sediment.	Odor.	Color.	Total.	Fixed.	Free.	Albuminoid	Nitrates.	Nitrites.				
5166	1908 Mar. 13	V. faint	V. slight	None	0.60	3.3	1.7	.0006	.0090	.0120	.0000	.20	1.2	....	..
5523	Aug. 18	None	None	Swampy	1.60	8.3	1.8	.0012	High	.0080	.0000	.16	1.1	....	*
5683	Sept 24	None	V. slight	None	0.30	3.2	1.4	.0002	.0090	.0020	.0000	.11	0.4	....	..
7696	1910 Mar. 9	V. slight	V. slight	Sl. swamp	0.10	4.4	1.5	.0002	.0086	.0050	.0000	.22	0.4	....	..
8584	Dec. 13	V. slight	V. slight	Sl. earthy	0.30	4.3	2.6	.0030	.0090	.0050	.0000	.25	0.4	....	..
8603	Dec. 30	V. slight	None	Swampy	0.60	5.3	3.7	.0180	High	.0050	.0000	.25	1.9	....	*
8619	1911 Jan. 10	V. slight	V. slight	Marsh	0.70	6.3	2.6	.0110	.0130	.0050	.0000	.12	1.9	....	..
8654	Jan. 18	V. slight	V. slight	Swampy	0.70	6.0	2.6	.0120	.0130	.0050	.0000	.15	1.9	....	*
8865	May 17	Slight	Slight	M'rshy	1.10	4.2	2.6	.0010	High	.0030	.0000	.23	0.4	....	..
9548	Nov. 9	V. slight	V. slight	Sl. swampy	1.20	7.2	2.7	.0020	High	.0025	.0000	.22	0.4	....	..
9549	Nov. 9	V. slight	Slight	Sl. swampy	0.40	3.5	1.0	.0010	High	.0050	.0000	.20	0.4	....	*[1]
9551	Nov. 9	Slight	V. slight	Sl. swampy	1.40	6.5	3.0	.0020	High	.0050	.0000	.20	0.3	....	[2]
9922	1912 May 14	V. slight	V. slight	Sl. m'rshy	1.00	4.2	2.0	.0015	.0035	.0050	High	.12	0.4	....	..

* B. Coli present; [1] Collected from Bear Hill Pond; [2] Collected from reservoir.

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Examination of Water from Suncook River and Canal

Number.	Date of collection.	Appearance				Residue on Evapo'n		Ammonia		Nitrogen as		Chlorine.	Hardness.	Lead.	
		Turbidity.	Sediment.	Odor.	Color.	Total.	Fixed.	Free.	Albuminoid	Nitrates.	Nitrites.				
8584	1910 Dec. 12	.....	.....	.....	....	.....	....	.....	.....	.....	.....	....	....	....	*1
8585	Dec. 14	Slight	Sl. floc.	Earthy	0.30	3.7	2.2	.0030	.0090	.0050	.0000	.35	1.2	....	*2
8586	Dec. 14	Slight	Mod.flo.	Earthy	0.30	5.2	3.4	.0030	.0090	.0050	.0000	.35	1.2	....	*3
8585b	Dec. 14	.....	.....	.....	....	.....	....	.....	.....	.....	.....	....	....	....	*4
8586b	Dec. 14	.....	.....	.....	....	.....	....	.....	.....	.....	.....	....	....	....	*5
8666	1911 Jan. 27	Moderate	V. slight	Earthy.	0.30	3.7	1.5	.0100	.0085	.0050	.0000	.15	0.4	....	*6
8667	Jan. 27	.....	.....	.....	....	.....	....	.....	.....	.....	.....	....	....	....	*1
8668	Jan. 27	.....	.....	.....	....	.....	....	.....	.....	.....	.....	....	....	....	*6

* B. Coli present; [1] Pumped from Suncook River; [2] Tap at Dr. Lavallee's; [3] From Canal, Suncook Mills; (pumped into supply system temporarily) [4] At dam, Suncook River; [5] At dam, across river from intake then used; [6] Suncook River, at proposed intake, above that used at the time.

Examination of Water from Baker & Dearborn Supply.

5170	1908 Mar.16	None	V. slight	None	0.05	3.0	2.0	.0004	.0002	.0100	.0000	.17	1.2	....	..
7707	1910 Mar.10	Sl. op.	V. slight	Earthy	0.00	6.0	2.9	.0006	.0020	.0050	.0000	.09	2.0	....	..
8617	1911 Jan. 6	Sl. opal	None	Clay	0.05	4.4	3.2	.0010	.0020	.0050	.0000	.07	1.9	....	..
8885	May 17	V.slight	V. slight	None	0.35	4.0	2.8	.0010	.0010	.0100	.0000	.15	1.5	....	..

Examination of Water from Wells Supplying Pembroke Academy.

7337	1909 Sept 3	None	None	None	0.00	.....	....	.0001	.0005	.1500	.0000	0.70	1.6	.030	..
6003	Feb. 23	None	None	None	0.00	.....	....	.0020	.0010	.2000	.0000	6.30	11.5	trace	..
7504	Oct. 3	V.slight	V. slight	Slight	0.00	2.5	....	.0010	.0020	.0100	.0000	0.70	1.9	....	*
7760	1910 Apr. 6	None	None	None	0.00	.....	....	.0004	.0008	Very high	.0000	6.62	12.4	.000	..
7852	Apr. 30	V.slight	Sl. floc.	Sl. clay	0.05	5.4	3.5	.0015	.0030	.0650	.0000	0.65	0.6	....	..
8810	1911 Apr. 22	None	None	Earthy	0.05	.....	....	.0110	.0050	.0500	.0000	0.65	1.9	.025	..
9343	Aug. 25	Mod. opal	V. slight	None	0.15	.....	....	.0010	.0010	.0050	Sl. trace	0.10	3.1	....	..

* B. coli present.

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Examination of Water from Supplies Owned by Suncook Mills.

Number.	Date of collection.	Appearance				Residue on Evapo'n		Ammonia		Nitrogen as		Chlorine.	Hardness.	Lead.	
		Turbidity.	Sediment.	Odor.	Color.	Total.	Fixed.	Free.	Albuminoid	Nitrates.	Nitrites.				
7803	1910 Apr. 14	None	V. slight	None	0.10	.....	....	.0002	.0051	High	.0005	1.15	3.4	V'ry h'gh	*
10104	1912 July 2	None	None	None	0.05	.....	....	.0010	.0015	.0750	.0000	1.10	4.6	....	*
10105	July 2	None	None	None	0.05	.....	....	.0020	.0010	.1000	.0000	1.60	4.6	....	*

* B. Coli present; [1] Well; [2] Spring.

Examination of Water from Well of Fowler Brothers.

9927	1912 May 15	None	Slight	Slight	0.05	.....	....	.0010	.0020	.0050	Ft. trace	0.80	2.0	.010	*

* B. coli present.

Examination of Water from Spring of George B. Lake.

8598	1910 Dec. 29	None	V. slight	None	0.00	2.4	2.1	.0010	.0020	.0025	.0000	.10	1.2	....	..

Examination of Water from Soucook River, Proposed Source of New Supply for Suncook and Pembroke.

9550	1911 Nov 1	V. slight	Sl. floc.	Sl. swam-py	0.45	5.3	2.8	.0010	.0095	.0025	.0000	.18	0.7	....	..

Examination of Water from Spring of B. & M. R. R.

8618	1911 Jan. 9	None	None	Sl. foul	0.00	.....	....	.0045	.0010	.0250	.0000	.10	2.6	....	..

Examination of Water from a Well Owned by the Town Used as a School Supply.

8884	1911 May 16	None	Slight	None	0.05	57.3	33.6	.0020	.0020	.5000	.0000	12.0	11.8	....	..

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Peterborough.—In 1895 the town installed a water supply from a brook fed by springs. The watershed is three miles by one mile in extent, consisting of pasturage and woodland. It is a gravity system of approximately ten miles of distributing mains, iron; service pipes of iron, cement lined.

Examination of Water from Tap of Town Supply.

Number.	Date of collection.	Appearance				Residue on Evapo'n		Ammonia		Nitrogen as		Chlorine.	Hardness.	Lead.	
		Turbidity.	Sediment.	Odor.	Color.	Total.	Fixed.	Free.	Albuminoid	Nitrates.	Nitrites.				
	1909														
7260	Aug. 9	Slight	Mod.floc	V. Sl. veg.	0.30	4.2	2.5	.0001	.0095	.0050	.0000	.10	0.7	....	..
7528	Dec. 1	None	None	None	0.40	4.3	1.8	.0002	.0060	.0050	.0000	.10	0.6	....	..
7575	Dec. 24	V.slight	Sl. floc.	Sl. earthy	0.05	3.0	1.0	.0005	.0080	.0000	.0000	.05	0.3	....	..
7576	Dec. 24	V.slight	V. slight	None	0.30	3.0	2.5	.0001	.0070	.0000	.0000	.05	0.9	....	..
	1910														
7822	Apr. 21	None	None	None	0.40	3.6	1.8	.0025	.0082	.0075	.0000	.20	0.6	....	..
8359	Aug. 29	None	V. slight	Earthy	0.10	.....	....	.0015	.0080	.0050	.0000	.05	0.4	....	..
	1911														
8866	May 11	None	None	None	0.35	3.3	2.0	.0010	.0020	.0025	.0000	.12	0.4	....	..
9189	July 31	Slight	V. slight	Swam-py	0.45	4.0	2.5	.0010	.0085	.0025	.0000	.12	0.6	....	..
	1912														
9914	May 20	Slight	V. slight	V.slight	0.35	3.2	2.0	.0010	.0030	.0300	.0000	.13	0.6	....	..
10245	July 23	Sl. fine	Slight	Sl. fish	0.07	.....	....	.0010	.0035	.0050	.0000	.05	0.1	....	..

Examination of Water from Well at Unitarian Parsonage.

	1911														
9451	Sept 26	None	Sl. ferrug	None	0.00	.....	....	.0010	.0015	.0030	.0000	.10	1.4	....	..

Pittsfield.—The Pittsfield Aqueduct Company installed a gravity system of water works in 1884, the source bring a pond fed by springs. The distributing reservoir has a capacity of 1,500,000 gallons.

There are four miles of mains, largely cement lined; service pipes, cement lined, plain iron, and galvanized iron. Four hundred families, substantially the whole village, are takers.

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Examination of Water from the Pittsfield Aqueduct Company.

Number.	Date of collection.	Appearance				Residue on Evapo'n		Ammonia		Nitrogen as		Chlorine.	Hardness.	Lead.	
		Turbidity.	Sediment.	Odor.	Color.	Total.	Fixed.	Free.	Albuminoid	Nitrates.	Nitrites.				
5984	1909 Feb. 10	Slight	Sl. veg.	Sl. earthy	0.10	3.4	1.9	.0020	.0060	.0100	.0000	.17	.2	....	..
7131	June 23	V. slight	None	Earthy	0.05	.....	....	.0005	.0035	.0300	.0000	.11	.4	....	..
7534	Dec. 2	None	None	None	0.05	3.0	1.3	.0010	.0065	.0050	.0000	.20	.7	....	..
8868	1911 May 12	None	None	None	0.08	1.8	0.8	.0010	.0050	.0025	.0000	.06	0.6	....	..
9919	1912 May 14	None	V. slight	None	0.07	3.4	2.1	.0010	.0025	.0025	.0000	.14	0.6	....	..

Plainfield.—A gravity supply was introduced in 1890–91 by the Meriden Water Company. The source is springs dug from 7 to 10 feet deep, and flowing from 10 to 30 gallons per minute. Twenty families, besides the hotel and boarding house, are supplied from this source. Surveys have recently been made for a spring supply system for Plainfield Village.

Examination of Water of Meriden Water Company.

Number.	Date of collection.	Appearance				Residue on Evapo'n		Ammonia		Nitrogen as		Chlorine.	Hardness.	Lead.	
		Turbidity.	Sediment.	Odor.	Color.	Total.	Fixed.	Free.	Albuminoid	Nitrates.	Nitrites.				
5685	1908 Sept 24	Con.	Con. earthy	Mark. foul	Clo udy	.....	....	.0070	.0062	.0040	.0000	.25	....	....	[1]
5687	Sept 24	V. slight	Sl. earthy	Sl. marshy	0.05	.....	....	.0046	.0036	.0040	.0001	.10	....	....	..
5774	Oct. 20	Mark. op.	Med. clay	None	Clo udy	15.0	11.8	.0010	.0080	.0000	.0000	.05	7.1	....	[2]
5842	Nov.17	None	Sl. earthy	Sl. earthy	0.00	10.0	7.2	.0010	.0020	.0000	.0000	.05	5.6	....	..
7497	1909 Oct. 28	Slight	Sl. earthy	None	0.05	12.2	7.7	.0010	.0045	.0050	.0000	.12	6.7	....	..
7820	1910 Apr. 20	None	Sl. earthy	Earthy	0.00	4.1	2.7	.0012	.0030	.0100	.0000	.15	2.0	....	..
8927	1911 May 29	Sl. opal	Mod. earthy	Sl. earthy	0.00	7.4	5.6	.0010	.0040	.0025	.0000	.05	2.4	....	..
9958	1912 May 23	Sl. opal	Sl. floc.	V. Sl. earthy	0.03	4.8	3.8	.0040	.0020	.0050	.0000	.04	2.2	....	..

[1] Well in Freeman's pasture, supplies K. U. A. [2] Hole in O. A. Stearn's field.

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Examination of Water from Spring Proposed Supply for Plainfield Village.

Number.	Date of collection.	Appearance				Residue on Evapo'n		Ammonia		Nitrogen as		Chlorine.	Hardness.	Lead.	
		Turbidity.	Sediment.	Odor.	Color.	Total.	Fixed.	Free.	Albuminoid.	Nitrates.	Nitrites.				
10379	1912 Aug. 14	None	None	None	0.03	.....	....	.0005	.0005	.0050	.0000	.08	6.0	....	..

Plaistow.

Examination of Water from Spring on Bank of Stream, Proposed Source of Public Supply.

Number.	Date of collection.	Appearance				Residue on Evapo'n		Ammonia		Nitrogen as		Chlorine.	Hardness.	Lead.	
		Turbidity.	Sediment.	Odor.	Color.	Total.	Fixed.	Free.	Albuminoid	Nitrates.	Nitrites.				
8762	1911 Mar.24	Slight	Sl. veg.	Vege-table	0.55	6.2	2.9	.0010	.0070	.0050	.0000	.33	2.6	....	..

Plymouth.—The town installed a system of water works in 1881, the supply being from springs and wells. The average depth of the wells is six feet. The water flows by gravity to two reservoirs having a capacity of 4,000,000 gallons; area, one acre; average depth, 12 feet. There are six miles of cement lines, and two miles of cast iron mains, with galvanized iron service pipes. Fifteen per cent. of the population take this water.

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Examination of Water from Town Supply.

Number.	Date of collection.	Appearance				Residue on Evapo'n		Ammonia		Nitrogen as		Chlorine.	Hardness.	Lead.	
		Turbidity.	Sediment.	Odor.	Color.	Total.	Fixed.	Free.	Albuminoid	Nitrates.	Nitrites.				
5509	1908 Aug. 13	None	None	None	0.00	4.1	2.3	.0004	.0000	.0050	.0000	.08	0.4	....	..
5954	1909 Jan. 27	None	None	None	0.00	4.0	2.5	.0001	.0001	.0700	.0000	.12	1.2	....	..
7540	Dec. 6	None	None	Con. earthy	0.10	4.3	3.0	.0008	.0020	.0100	.0000	.08	1.5	....	..
8959	1911 June 7	V. slight	Slight	Musty	0.25	4.7	2.5	.0015	.0050	.0025	.0000	.08	1.4	....	..
9060	July 10	None	Sl. floc.	None	0.05	3.6	2.3	.0010	.0025	.0050	.0000	.10	1.2	....	..
9061	July 10	None	V. slight	None	0.00	2.8	2.0	.0005	.0010	.0100	.0000	.07	1.4	....	*
9062	July 10	V. slight	V. slight	Sl. earthy	0.05	4.1	2.8	.0010	.0060	.0100	Sl. trace	.07	1.2	....	*
9931	1912 May 16	Ft. opal	V. slight	None	0.10	3.9	3.0	.0008	.0015	.0050	.0000	.09	1.2	....	..

* B. Coli present.

Portsmouth.—The city constructed a system of water works in 1891, the source being wells and springs. The watershed is about four square miles in area, partly wooded; no inhabitants very near. The wells are driven from 70 to 100 feet, in gravel. The water is pumped to a standpipe having a capacity of 500,000 gallons.

Examination of Water from Portsmouth Water Supply.

Number.	Date of collection.	Appearance				Residue on Evapo'n		Ammonia		Nitrogen as		Chlorine.	Hardness.	Lead.	
		Turbidity.	Sediment.	Odor.	Color.	Total.	Fixed.	Free.	Albuminoid	Nitrates.	Nitrites.				
6002	1909 Feb. 23	None	None	None	0.00	15.3	9.4	.0004	.0004	.1500	.0000	.54	6.9	....	..
7690	1910 Mar. 8	None	None	None	0.00	16.9	10.8	.0002	.0022	.0100	.0000	.66	8.0	....	..
8475	Oct. 10	None	V. slight	None	0.00	.....	....	.0010	.0070	.0100	.0000	.45	3.9	....	..
9008	1911 June 21	Slight	Sl. fibre	None	0.00	15.6	10.9	.0010	.0010	.0350	.0000	.60	6.9	....	..

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Examination of Water from Sources under Consideration as Additions to the Public Supply.

Number.	Date of collection.	Appearance				Residue on Evapo'n		Ammonia		Nitrogen as		Chlorine.	Hardness.	Lead.	
		Turbidity.	Sediment.	Odor.	Color.	Total.	Fixed.	Free.	Albuminoid	Nitrates.	Nitrites.				
9143	1911 July 19	V. slight	Mod. floc.	Earthy	0.00	10.2	7.9	.0060	.0035	.0100	.0000	0.55	2.4	....	*
9144	July 19	Slight	Slight	None	0.18	15.2	13.6	.0100	.0045	.0200	.0000	0.95	7.3	....	*1
9145	July 19	Slight	Sl.fibrous	None	0.00	15.1	10.3	.0065	.0065	.0150	.0000	1.00	4.0	....	*2
9146	July 19	Slight	Sl. floc.	None	0.25	6.7	5.0	.0100	.0065	.0100	.0000	0.70	1.5	....	*3
9286	Aug. 22	None	V. slight	.....	0.00	9.8	7.0	.0045	.0020	.0050	.0000	0.55	3.9	....	*

* B. Coli present. [1] Spring of C. H. Brackett, Greenland. [2] Spring of F. Pickering, Newington. [3] Stream on property of C. Otis.

Raymond.—In 1893 the town installed a public water supply from a system of wells driven from 40 to 60 feet deep, through loam, sand and gravel. The water is pumped to a standpipe having a capacity of 118,037 gallons. The watershed is about one square mile in area, is about equally wooded and cleared, and on it are about 600 inhabitants.

Examination of Water from Raymond Supply.

Number.	Date of collection.	Appearance				Residue on Evapo'n		Ammonia		Nitrogen as		Chlorine.	Hardness.	Lead.	
		Turbidity.	Sediment.	Odor.	Color.	Total.	Fixed.	Free.	Albuminoid	Nitrates.	Nitrites.				
6015	1909 Mar. 4	None	None	None	0.05	15.8	9.7	.0001	.0005	.3500	.0000	2.50	4.9	....	..
7694	1910 Mar. 8	None	None	None	0.00	11.7	9.8	.0030	.0002	.0400	.0030	2.31	6.0	....	..
8956	1911 June 7	None	None	None	0.05	17.0	9.8	.0020	.0020	.1000	.0000	2.50	4.9	....	..
9929	1912 May 15	None	None	None	0.07	17.5	14.5	.0010	.0020	.2000	High	2.35	4.9	....	..
9990	May 31	None	None	None	0.05	15.7	12.2	.0010	.0020	.2000	.0000	2.33	4.9	....	..

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Richmond.

Examination of Water from Cass Pond.

Number.	Date of collection.	Appearance				Residue on Evapo'n		Ammonia		Nitrogen as		Chlorine.	Hardness.	Lead.	
		Turbidity.	Sediment.	Odor.	Color.	Total.	Fixed.	Free.	Albuminoid	Nitrates.	Nitrites.				
8835	1911 Apr. 30	None	Slight	None	0.05	.....	....	.0040	.0100	.0050	.0000	.03	0.3	....	*

* B. Coli present.

Rindge.

Examination of Water from Well of Martha T. Perry.

Number.	Date of collection.	Appearance				Residue on Evapo'n		Ammonia		Nitrogen as		Chlorine.	Hardness.	Lead.	
		Turbidity.	Sediment.	Odor.	Color.	Total.	Fixed.	Free.	Albuminoid	Nitrates.	Nitrites.				
10008	1912 June 6	None	None	None	0.00	.....	....	.0010	.0015	.0350	.0000	.30	1.9	....	*

* B. coli present.

Examination of Water from Well of Emma T. Danforth.

9949	1912 May 21	V.slight	Slight	Foul	0.05	.....	....	High	.0080	.3000	High	2.70	5.1	....	..

Rochester.—The Rochester Water Works, a gravity system owned by the city, installed in 1885, has for a source a pond and reservoir, the pond being about one hundred acres, and the reservoir fifty-four acres in area. The watershed, six square miled in extent, is both wooded and cleared, with, perhaps, 75 inhabitants. Two thirds of the population is supplied.

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Examination of Water from Rochester Supply.

Number.	Date of collection.	Appearance				Residue on Evapo'n		Ammonia		Nitrogen as		Chlorine.	Hardness.	Lead.	
		Turbidity.	Sediment.	Odor.	Color.	Total.	Fixed.	Free.	Albuminoid	Nitrates.	Nitrites.				
5898	1908 Dec. 22	V. slight	V. slight	Musty	0.60	4.3	2.6	.0020	.0180	.0000	.0000	.22	1.1	....	..
7227	1909 July 29	None	None	Pec.	0.20	1.9	1.0	.0015	.0065	.0000	.0000	.05	0.3	....	..
7699	1910 Mar. 9	Slight	Slight	Foreign	0.40	4.0	1.4	.0002	.0044	.0050	.0000	.29	0.7	....	..
8288	Aug. 8	None	V. slight	None	0.15	2.5	1.0	.0020	.0080	.0025	.0000	.18	0.4	....	..
7814	Apr. 20	Slight	Mod.	Swampy	0.50	5.4	2.8	.0040	.0065	.0035	.0000	.27	0.4	....	*
8555	Nov. 23	None	None	Foreign	0.40	2.9	1.4	.0010	.0090	.0025	.0000	.12	0.4	....	..
8556	Nov. 23	None	None	Foreign	0.50	3.5	1.8	.0140	.0150	.0025	.0000	.20	0.4	....	..
8902	1911 May 19	Moderate	Consid. gelat.	Sl. veg.	0.55	4.0	2.0	.0010	.0070	.0100	.0000	.25	0.4	....	..
9273	Aug. 15	None	Sl. fibre	None	0.10	3.3	2.3	.0010	.0065	.0025	.0000	.20	0.4	....	..
9456	Sept. 29	Slight	Slight	None	0.50	3.2	1.0	.0010	High	.0025	.0000	.08	0.3	....	..
9933	1912 May 16	V. Sl. opal	Slight	V. Sl. marshy	0.30	2.7	2.0	.0010	.0035	.0100	.0000	.18	0.4	....	*
9993	June 3	None	V. slight	Earthy.	0.00	2.5	1.5	.0010	.0020	.0750	.0000	.12	0.3	....	..

*B. coli present.

Examination of Water from the Spring of S. T. Wentworth.

8705	1911 Feb. 22	None	Sl. fibre	Dist. earthy	0.05	.....	....	.0030	.0055	.1500	.0000	1.30	3.9	....	..

Examination of Water from the Well of Henry Pinkham.

9139	1911 July 30	Mark. opal	V. slight	Mark. veg.	0.25	.....	....	High	.0025	.0100	.0000	.70	6.0	....	..

Examination of Water from Cocheco River, where Ice is Cut.

9106	1911 July 17	Slight	Sl. veg.	Earthy	0.40	3.9	2.6	.0040	.0075	.0025	.0000	.20	0.6	....	*

Examination of Ice Cut from Cocheco River.

9107	1911 July 17	V. slight	V. slight	V. slight	0.05	0.8	....	.0010	.0010	.0050	.0000	.02	0.1	....	*
9186	July 26	.....	.....	.....	....	.....	....	.....	.....	.....	.....	....	....	....	†
9350	Aug. 28	.....	.....	.....	....	.....	....	.....	.....	.....	.....	....	....	....	†

* B. Coli present. † No coli. Clear ice of good appearance.

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Rollinsford.

Examination of Water from Public Well.

Number.	Date of collection.	Appearance				Residue on Evapo'n		Ammonia		Nitrogen as		Chlorine.	Hardness.	Lead.	
		Turbidity.	Sediment.	Odor.	Color.	Total.	Fixed.	Free.	Albuminoid	Nitrates.	Nitrites.				
10237	1912 July 22	None	V. slight	None	0.05	.....	.....	.0010	.0020	.1000	.0000	2.30	12.0	....	..

Rumney.

Examination of Water from the Spring of G. C. Craig.

Number.	Date of collection.	Appearance				Residue on Evapo'n		Ammonia		Nitrogen as		Chlorine.	Hardness.	Lead.	
		Turbidity.	Sediment.	Odor.	Color.	Total.	Fixed.	Free.	Albuminoid	Nitrates.	Nitrites.				
8523	1910 Nov. 4	None	None	Sl. earthy	0.00	.....	.....	.0010	.0010	.0050	.0000	.05	2.6	....	..

Examination of Water from Cistern of Daniel Pillsbury.

10000	1912 June 5	None	None	None	0.05	.....	....	.0005	.0005	.0025	Ft. trace	.02	0.4	V'ry H'g.	..

Salem.—A gravity supply was installed in 1903 by the Salem Water Works Company. The source, Canobie Lake, is of about 1,000 acres in area, 40 feet in depth on an average, and has a gravelly bottom. The watershed is approximately 500 acres, mostly wooded. The shore of the pond, upon which is Canobie Lake Park, is frequented by summer cottagers and excursionists. The water flows by gravity through about three miles and a half of iron main pipe, and the service pipes are of galvanized iron. It is estimated that 15 per cent. of the population use this water.

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Examination of Water Taken from Canobie Lake.

Number.	Date of collection.	Appearance				Residue on Evapo'n		Ammonia		Nitrogen as		Chlorine.	Hardness.	Lead.	
		Turbidity.	Sediment.	Odor.	Color.	Total.	Fixed.	Free.	Albuminoid	Nitrates.	Nitrites.				
6077	1909 Apr. 8	None	None	Mr'shy	0.05	2.8	1.5	.0030	.0070	.0050	.0000	.30	.3	....	..
8743	1911 Mar.13	None	None	Sl. marshy	0.10	2.5	1.0	.0024	.0062	.0060	.0000	.50	1.4	....	..
9325	Aug. 22	None	None	Veg.	0.00	4.0	2.5	.0010	.0065	.0050	.0000	.40	0.4	....	..
9968	1912 May 24	V. slight	Sl. coarse	Earthy.	0.07	2.5	1.6	.0006	.0050	.0050	.0000	.40	0.3	....	..

Examination of Water from Wells Supplying Schoolhouse.

7882	1910 May 12	None	None	None	0.05	.....	....	.0010	.0017	.0025	.0000	.40	1.5	....	..
9400	1911 Sept. 7	None	V. slight	None	0.00	3.8	2.5	.0002	.0014	.0020	.0000	.44	2.3	....	..
9943	1912 May 20	V. Sl. opal	Sl. floc.	Marked veg.	0.08	.....	....	.0010	.0020	.2500	.0000	1.00	7.9	....	..

Somersworth.—A system of water works was constructed in 1895–96. The water, which is taken from the Salmon Falls River, flows by gravity through a small screen well, thence upon a single covered sand filter of one-half acre area, and is pumped from the clear water well to a standpipe of 902,147 gallons capacity. Average daily pumpage, 600,000 gallons.

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Examination of Water Supplying Somersworth.

Number.	Date of collection.	Appearance				Residue on Evapo'n		Ammonia		Nitrogen as		Chlorine.	Hardness.	Lead.	
		Turbidity.	Sediment.	Odor.	Color.	Total.	Fixed.	Free.	Albuminoid	Nitrates.	Nitrites.				
5256	1908 Apr. 27	Slight	Mod. floc	Earthy	0.40	4.5	1.2	.0026	.0130	.0080	.0000	.22	1.5	....	*
5257	Apr. 27	None	Slight	Sl.stale	0.30	3.4	1.2	.0010	.0066	.0100	.0000	.18	0.7	....	1
5830	Nov. 9	None	V. slight	Earthy	0.20	4.8	2.2	.0015	.0040	.0100	.0000	.22	1.4	....	*
5864	Nov.25	None	None	None	0.20	4.3	2.2	.0002	.0075	.0000	.0000	.25	1.3	....	..
6000	1909 Feb. 24	None	None	M'shy	0.30	4.5	1.9	.0020	.0040	.0200	.0000	.18	1.6	....	*
7518	Nov.18	None	None	None	0.30	4.0	1.7	.0002	.0070	.0050	.0000	.20	1.6	....	*
7708	1910 Mar. 9	V. slight	None	Earthy	0.40	3.8	2.0	.0004	.0034	.0100	.0000	.27	1.1	....	..
8000	June 29	V. slight	Slight	None	0.60	4.0	2.5	.0010	.0070	.0050	.0000	.25	1.9	....	..
9096	1911 July 13	Mod. opal	Sl. veg.	None	0.50	6.1	3.5	.0110	.0075	.0050	.0000	.22	2.6	....	..
9934	1912 May 16	None	Sl. fine	None	0.55	3.5	2.5	.0026	.0035	.0050	.0000	.20	1.1	....	*

* B. Coli present.

Examination of Water from Well of Great Falls Manufacturing Company.

7902	1910 May 19	None	None	Sl. earthy	0.00	22.3	19.8	.0010	.0015	.2500	.0016	5.2	11.0	....	*
10366	1912 Aug. 12	None	V. Sl. coarse	Foreign	0.00	.....	....	.0010	.0010	.3000	.0000	3.90	10.2	....	*

* B. Coli present.

Examination of Water from Well of Mary Stanton.

8439	1910 Sept 22	None	None	None	0.00	.....	....	.0010	.0015	.2250	.0000	7.3	12.4	....	..

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Stark.

Examination of Water from the Springs of the Paris Mfg. Co.

Number.	Date of collection.	Appearance				Residue on Evapo'n		Ammonia		Nitrogen as		Chlorine.	Hardness.	Lead.	
		Turbidity.	Sediment.	Odor.	Color.	Total.	Fixed.	Free.	Albuminoids.	Nitrates.	Nitrites.				
10404	1912 Aug. 22	None	Sl. floc.	None	0.00	.....	....	.0005	.0005	.0025	.0000	.03	1.1	....	..
10405	Aug. 22	V. slight	None	None	0.00	.....	....	.0005	.0005	.0025	.0000	.03	1.7	....	..
10406	Aug. 23	None	None	None	0.00	.....	....	.0010	.0010	.0025	.0000	.03	1.2	....	..

Stewartstown.

Examination of Water from Springs Supply.

Number.	Date of collection.	Appearance				Residue on Evapo'n		Ammonia		Nitrogen as		Chlorine.	Hardness.	Lead.	
		Turbidity.	Sediment.	Odor.	Color.	Total.	Fixed.	Free.	Albuminoid	Nitrates.	Nitrites.				
9814	1912 Apr. 15	Floc.	Grey floc.	Sl. acrid	0.18	5.8	2.9	Very high	.0105	.0100	.0000	.05	1.4	....	..
9818	Apr. 15	V. slight	V. slight	Ft. earthy	0.08	7.1	6.1	.0010	.0015	.0050	.0000	.04	2.0	....	..

Stratford.—The Coös & Essex Water Company, representing a consolidation of the original Hutchins and Stevens supplies, furnishes North Stratford from a gravity system of springs. There are three miles of galvanized iron mains, with services of the same material; 100 families are supplied.

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Examination of Water from Supply of Coös & Essex Water Company.

Number.	Date of collection.	Appearance				Residue on Evapo'n		Ammonia		Nitrogen as		Chlorine.	Hardness.	Lead.	
		Turbidity.	Sediment.	Odor.	Color.	Total.	Fixed.	Free.	Albuminoid	Nitrates.	Nitrites.				
5839	1908 Oct. 8	None	Slight	None	0.15	2.6	1.9	.0014	.0036	.0030	.0000	.05	1.9	....	*
6007	1909 Mar. 1	None	V. slight	None	0.05	3.7	2.5	.0002	.0008	.0300	.0000	.05	1.6	....	..
7714	1910 Mar.10	None	V. slight	None	0.00	3.7	3.0	.0002	.0004	.0100	.0000	.10	2.7	....	..
8972	1911 June 8	None	None	None	0.00	5.0	3.3	.0010	.0010	.0025	.0000	.08	1.7	....	..
9947	1912 May 20	None	None	None	0.03	4.1	3.5	.0010	.0020	.0300	.0000	.06	1.9	....	..

*B. coli present.

Examination of Water from Well of North Stratford Creamery Company.

9386	1911 Sept. 4	V. S. opal	V. slight	None	0.00	.....	....	.0012	.0004	.0600	Trace	2.18	7.4	....	..

Examination of Water from Spring of W. W. Baldwin, Supplying Three Families.

9651	1911 Dec. 24	None	V. slight	Sl. foul	0.35	.....	....	.0005	.0065	.0030	.0000	0.05	1.9	H'gh	..

Sunapee.—The Sunapee Water Works, owned by the town, were built in 1900, Sunapee Lake being the source from which water is taken to supply the Sunapee Village and Ledge Pond for George's Mills. Water from the pond flows by gravity, while that from the lake is pumped to a reservoir of 300,000 gallons' capacity. There are about five miles of distributing mains of cast iron and galvanized iron pipes. Ninety per cent. of the population use this supply.

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Examination of Water from Lake Sunapee.

Number.	Date of collection.	Appearance				Residue on Evapo'n		Ammonia		Nitrogen as		Chlorine.	Hardness.	Lead.	
		Turbidity.	Sediment.	Odor.	Color.	Total.	Fixed.	Free.	Albuminoid	Nitrates.	Nitrites.				
5396	1908 July 2	V. slight	S. floc.	Mrk'd earthy	0.20	.....	....	.0002	.0036	.0070	.0000	.10	0.4	....	..
7693	1910 Mar. 8	None	None	None	0.05	3.2	1.2	.0006	.0032	.0050	.0000	.13	.7	....	..
7704	Mar. 9	None	None	Sl. swampy	0.20	3.6	1.8	.0006	.0105	.0050	.0000	.11	1.1	....	..
8964	1911 June 8	None	None	Sl. earthy	0.05	3.4	1.7	.0005	.0020	.0050	.0000	.10	1.1	....	..
9392	Sept. 4	V. slight	Slight	None	0.05	3.2	2.2	.0004	.0086	.0030	.0000	.12	0.3	....	..
9945	1912 May 20	None	None	Sl. earthy	0.05	3.0	2.0	.0010	.0035	.0050	.0000	.08	0.6	....	..

Sutton.

Examination of Water from Town Well.

Number.	Date of collection.	Appearance				Residue on Evapo'n		Ammonia		Nitrogen as		Chlorine.	Hardness.	Lead.	
		Turbidity.	Sediment.	Odor.	Color.	Total.	Fixed.	Free.	Albuminoid	Nitrates.	Nitrites.				
8473	1910 Oct. 9	None	V. slight.	None	0.05	.....	....	.0012	.0040	.0050	.0000	.20	3.2	....	..

Sullivan.

Examination of Water from Well of Congregational Society.

Number.	Date of collection.	Appearance				Residue on Evapo'n		Ammonia		Nitrogen as		Chlorine.	Hardness.	Lead.	
		Turbidity.	Sediment.	Odor.	Color.	Total.	Fixed.	Free.	Albuminoid	Nitrates.	Nitrites.				
8995	1911 June 15	Slight	S. ferrug	Earthy.	0.05	.....	....	.0030	.0010	.0200	.0000	.55	1.9	.025	..

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Swanzey.

Examination of Water from Wells of Swanzey School District.

Number.	Date of collection.	Appearance				Residue on Evapo'n		Ammonia		Nitrogen as		Chlorine.	Hardness.	Lead.	
		Turbidity.	Sediment.	Odor.	Color.	Total.	Fixed.	Free.	Albuminoid	Nitrates.	Nitrites.				
8400	1910 Sept. 7	Slight	Slight	Earthy	0.00	15.9	6.5	Very high	.0042	.2000	Trace	1.48	3.2	....	..
8691	1911 Feb. 13	None	Sl. grey	Sl. earthy	0.05	19.1	7.2	.0015	Very high	.2500	Sl. trace	3.75	4.9	....	..
8878	May 15	None	Sl. sandy	None	0.05	5.3	4.0	.0010	.0015	.0150	.0000	.45	2.0	....	[1]

[1] New driven well.

Examination of Water from the Supplies of the Snow & Bindell Co.

9467	1911 Oct. 5	Mod. opal	Mod. earthy	Sl. acrid	0.05	.....	....	.0010	.0025	.0100	High	.40	3.2	....	[1]
9776	1912 Mar. 18	Mod. opal	Sl. floc.	Mark. earthy	0.03	.....	....	.0015	.0035	.0300	.0000	.08	1.9	.025	[2]
9781	Mar. 25	V. slight	Mod. floc.	Mark. earthy	0.25	.....	....	.0040	.0065	.0050	.0000	.08	1.0	.037	[2]
10329	Aug. 6	Slight	V. slight	None	0.05	.....	....	.0010	.0015	.1000	High	7.3	10.3	....	[1]

[1] Well. [2] Spring.

Temple.

Examination of Water from the Spring of Mrs. W. A. Conant.

Number.	Date of collection.	Appearance				Residue on Evapo'n		Ammonia		Nitrogen as		Chlorine.	Hardness.	Lead.	
		Turbidity.	Sediment.	Odor.	Color.	Total.	Fixed.	Free.	Albuminoid	Nitrates.	Nitrites.				
8540	1910 July 7	Slight	Slight	Sl. veg.	0.05	.....	....	.0020	.0040	.0200	Trace	.10	1.9	.025	..

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Tilton.—The Tilton & Northfield Aqueduct Company's works were built in 1887–88. The source is Chestnut Pond, of 60 acres area, 10 to 76 feet deep, sandy or gravelly bottom. Several hundred acres of the watershed are pasture and woodland; five farms. This is a gravity system, with 12 miles of cement-lined and cast-iron mains, with galvanized iron service pipes. Probably 500 families take this water, 80 or 90 per cent. of the population.

Examination of Water from a Faucet of the Tilton & Northfield Aqueduct Company.

Number.	Date of collection.	Appearance				Residue on Evapo'n		Ammonia		Nitrogen as		Chlorine.	Hardness.	Lead.	
		Turbidity.	Sediment.	Odor.	Color.	Total.	Fixed.	Free.	Albuminoid	Nitrates.	Nitrites.				
5873	1908 Dec. 1	None	V. slight	Earthy	0.10	1.9	....	.0001	.0120	.0500	.0000	.12	.10	....	..
5861	Nov. 25	V. slight	V. slight	Sl. earthy	0.10	1.5	0.4	.0010	.0080	.0000	.0001	.13	.10	....	..
7688	1910 Mar. 8	None	None	Earthy	0.05	1.9	0.6	.0024	.0050	.0050	.0000	.11	.40	....	..
8569	July 1	V. slight	V. slight	Dist. veg.	0.20	3.1	1.7	.0010	.0060	.0050	.0000	.20	1.2	....	..
8965	1911 Apr. 8	Moderate	Sl. earthy	Sl. earthy	0.05	3.3	1.3	.0010	.0070	.0025	.0000	.10	0.3	....	..
9942	1912 May 20	V. slight	Sl. floc.	Sl. marshy	0.55	3.2	1.7	.0010	.0060	.0050	.0000	.06	0.3	....	*

* B. coli present.

Examination of Water from Well of L. W. Perham, Used by Public.

9815	1912 Apr. 12	V. Sl. opal	V. slight	None	0.05	.....	....	.0010	.0015	.0150	.0000	1.00	0.9	....	..

Examination of Water from Well Supplying First Baptist Church at East Tilton.

10140	1912 July 11	Sl. opal	None	Earthy	0.05	.....	....	.0020	.0010	.0500	High	3.90	3.2	.010	..

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Troy.

Examination of Water from Well Owned by School District.

Number.	Date of collection.	Appearance				Residue on Evapo'n		Ammonia		Nitrogen as		Chlorine.	Hardness.	Lead.	
		Turbidity.	Sediment.	Odor.	Color.	Total.	Fixed.	Free.	Albuminoid	Nitrates.	Nitrites.				
8477	1910 Sept. 10	None	None	None	0.00	.....	....	.0010	.0010	.2000	.0000	2.00	5.3	....	..

Examination of Water from Well of F. B. Miles.

9387	1911 Oct. 15	Sl. opal	Mod. floc.	Foreign	0.00	14.4	9.3	.0004	.0050	.0700	.0000	1.39	4.4	Tr'ac	*

* B. coli present.

Examination of Water from Well Supplying Baptist Parsonage.

9384	1911 Sept. 5	None	None	None	0.05	.....	....	.0012	.0062	.0500	.0000	.70	6.1	.070	..

Examination of Water from Well of Congregational Society.

9983	1912 May 30	Slight	Sl. veg.	None	0.25	.....	....	.0025	.0050	.0050	.0000	.05	1.5	None	..

Examination of Water from Well of Congregational Parsonage.

9068	1911 July 10	.....	.....	.....	....	.....	....	.....	.....	.....	.....	....	....	High	..

Examination of Water from Well of Troy Blanket Mills.

9870	1912 Apr. 28	None	None	None	0.05	.....	....	.0006	.0015	.035	Trace	1.30	3.5	.010	..

Examination of Water Collected from Cistern, Troy Blanket Mills.

10114	1912 July 3	None	V. slight	None	0.05	.....	....	.0010	.0010	.0050	.0000	.28	.2	.075	..

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Unity.

Examination of Water from Well of Unity Grange.

Number.	Date of collection.	Appearance				Residue on Evapo'n		Ammonia		Nitrogen as		Chlorine.	Hardness.	Lead.	
		Turbidity.	Sediment.	Odor.	Color.	Total.	Fixed.	Free.	Albuminoid	Nitrates.	Nitrites.				
8376	1910 Aug. 31	None	V. slight	Sl. earthy	0.05	.....	.....	.0020	.0050	.0100	.0000	1.70	9.6	....	*

* B. coli present.

Wakefield.—A large proportion of the wells in this locality have been found to be polluted and there would seem to be considerable need of a public supply system. Efforts to this end have thus far proved fruitless.

Examination of Water in Connection with Proposed Supply for Sanbornville.

Number.	Date of collection.	Appearance				Residue on Evapo'n		Ammonia		Nitrogen as		Chlorine.	Hardness.	Lead.	
		Turbidity.	Sediment.	Odor.	Color.	Total.	Fixed.	Free.	Albuminoid	Nitrates.	Nitrites.				
8615	1911 Jan. 9	Moderate	Sl. floc.	Foreign	0.35	.....	....	Very high	Very high	.0050	.0000	.05	3.2	....	[1]
8614	Jan. 9	Slight	Sl. floc.	Foreign	0.30	.....	....	Very high	Very high	.0050	.0000	.05	2.6	....	[1]
8660	Jan. 22	V. slight	V. slight	Sl. earthy	0.20	4.3	2.8	.0085	.0060	.0025	.0000	.08	1.5	....	[2]
8661	Jan. 22	V. slight	V. slight	V. Sl. earthy	0.20	4.2	2.6	.0080	.0065	.0025	.0000	.20	1.5	....	[3]
8662	Jan. 22	V. slight	V. slight	V. Sl. earthy	0.20	4.0	2.5	.0100	.0085	.0025	.0000	.08	1.5	....	[4]

[1] From Mountain Lake. [2] One thousand feet above proposed intake on Cook's Brook. [3] Eight hundred feet below proposed intake on Cook's Brook. [4] At proposed intake, Cook's Brook.

Examination of Water from the Well of A. L. Taft, Supplying School.

8552	1910 Nov. 21	None	None	None	0.00	.....	....	.0030	.0030	.0025	.0000	.20	2.0	....	..

Walpole.—The Walpole Water & Sewer Company inaugurated a gravity system of water works in 1904, the source being an impounded

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stream. The site was stripped to a gravel and hard dirt bottom. The water flows through a filter bed to a distributing reservoir of concrete construction, covered on top, of about 50 feet diameter, 18 feet deep; capacity about 250,000 gallons.

The village of North Walpole also has a supply derived from springs.

Examination of Walpole Water Supply.

Number.	Date of collection.	Appearance				Residue on Evapo'n		Ammonia		Nitrogen as		Chlorine.	Hardness.	Lead.	
		Turbidity.	Sediment.	Odor.	Color.	Total.	Fixed.	Free.	Albuminoid	Nitrates.	Nitrites.				
5552	1908 Aug. 24	V. slight	V. slight	None	0.05	.....	....	.0034	.0024	.0150	.0000	.18	2.4	....	..
7702	1910 Mar. 9	None	None	None	0.05	4.1	2.8	.0004	.0014	.0050	.0000	.14	2.6	....	..
8518	Nov. 2	V. slight	V. slight	None	0.20	7.9	4.2	.0010	.0010	.0750	.0000	.60	3.9	....	..
8973	1911 June 13	V. slight	V. slight	None	0.08	4.4	3.1	.0010	.0020	.0050	.0000	.10	2.6	....	..
9982	1912 May 30	None	None	None	0.22	4.7	3.5	.0010	.0015	.0050	.0000	.07	2.4	....	..

Examination of Water from Supply of North Walpole.

5618	1908 Sept 12	None	V. slight	Foreign	0.00	4.6	3.7	.0016	.0016	.0100	.0000	0.24	1.8	....	*
5619	Sept 12	None	V. slight	Foreign	0.00	4.9	3.8	.0024	.0040	.0060	.0000	0.25	2.4	....	*
5663	Sept 21	None	None	None	0.00	7.5	3.2	.0002	.0032	.0080	.0000	0.33	2.6	....	..
5664	Sept 21	V. faint	V. slight	None	0.00	9.4	5.2	.0008	.0002	.0020	.0000	0.31	2.6	....	..
5665	Sept 21	None	None	None	0.00	.....	....	.0002	.0002	.0020	.0000	0.27	2.2	....	..
8757	1911 Mar.15	V. slight	None	None	0.05	5.0	3.0	.0010	.0025	.0050	.0000	2.21	2.16	.025	..
8969	June 8	V. slight	Mod. ferrug	None	0.00	4.9	3.8	.0010	.0015	.0025	.0000	0.15	2.2	.013	..
9978	1912 May 30	V. slight	Mod. floc.	None	0.05	5.1	3.8	.0010	.0010	.0050	.0000	0.25	2.2	.000	*

* B. coli present.

Examination of Water from Town Well.

5551	1908 Aug. 21	None	V. slight	None	0.00	17.3	13.7	.0004	.0018	.2200	.0000	2.11	5.0	....	..
7975	1910 June 18	None	V. slight	S. foul	0.00	8.0	3.8	.0020	.0010	.1000	.0000	1.10	3.5	....	..
9427	1911 Sept 18	Slight	Sl. coarse	None	0.05	29.8	26.0	.0050	.0025	.5000	High	3.40	8.1	....	*

* B. coli present.

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Warner.—The Warner Village Fire District supply, a gravity system, consists of a reservoir supplied by springs and a brook. The bottom is clayey hardpan in part, and part gravel; average depth, eight feet. Cast iron and galvanized iron pipe is used. The watershed is estimated at 400 acres, wooded; not more than twelve inhabitants.

Examination of Water from a Faucet of the Village District Supply.

Number.	Date of collection.	Appearance				Residue on Evapo'n		Ammonia		Nitrogen as		Chlorine.	Hardness.	Lead.	
		Turbidity.	Sediment.	Odor.	Color.	Total.	Fixed.	Free.	Albuminoid.	Nitrates.	Nitrites.				
5625	1908 Sept 12	V.slight	V. slight	Stale	0.10	.....	....	.0002	.0070	.0020	.0000	.06	1.2	....	*1
5641	Sept 16	Mod. floc.	Earthy	None	?	6.8	3.3	.0002	.0010	.0150	.0000	.35	2.9	....	*2
7705	1910 Mar.10	None	None	None	0.10	5.4	1.8	.0030	.0026	.0050	.0000	.18	.40	....	..
8496	Oct. 20	V.slight	Slight	Foreign	0.25	.....	....	.0040	.0050	.0050	.0000	.08	2.0	....	3
9241	1911 Aug. 4	V.slight	Sl. floc.	Foul	0.15	4.3	2.3	.0050	.0085	.0050	.0000	.09	0.3	....	..
10055	1912 June 19	V.slight	Sl. floc.	Slight	0.20	2.7	1.7	.0010	.0025	.0100	.0000	.04	0.1	....	..
10113	July 2	None	Sl. floc.	Slight	0.20	.....	....	.0010	.0010	.0025	.0000	.03	0.1	....	..

* B. coli present. [1] Auxiliary supply from Warner River. [2] New well 50 feet from the river. [3] Stream proposed addition to public supply.

Examination of Water from the Well of C. S. Brown.

10009	1912 June 7	V.slight	Mod. floc.	Sl. veg.	0.00	.....	....	.0010	.0010	.0500	.0000	.25	7.4	....	*

* B. coli present.

Examination of Water from Well Supplying Newton Camp.

10085	1912 June 28	None	None	None	0.00	.....	....	.0020	.0020	.0030	.0000	0.10	1.9	....	..

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Warren.—The H. N. Merrill Water Works furnishes water from springs and from a driven well 474 feet deep. Number of families reported as supplied from this source in 1912, twenty-two.

Examination of Water from Merrill Supply.

Number.	Date of collection.	Appearance				Residue on Evapo'n		Ammonia		Nitrogen as		Chlorine.	Hardness.	Lead.	
		Turbidity.	Sediment.	Odor.	Color.	Total.	Fixed.	Free.	Albuminoid	Nitrates.	Nitrites.				
4543	1907 May 18	None	None	Sl. veg.	0.00	4.6	3.4	.0004	.0006	.0700	.0000	.05	2.5	....	..
5075	Dec. 13	None	None	None	0.50	.....	....	.0008	.0024	.0040	.0000	.15	1.2	....	..
7730	1910 Mar.17	None	V. slight	None	0.00	4.0	2.6	.0016	.0012	.0060	.0000	.03	2.4	High	..
8280	Aug. 8	None	None	None	0.00	4.4	3.5	.0010	.0005	.0450	.0000	.05	2.6	.000	..

Weare.

Examination of Water from Pond on Trout Brook, Supplying N. H. N. G. Encampment, 1912.

Number.	Date of collection.	Appearance				Residue on Evapo'n		Ammonia		Nitrogen as		Chlorine.	Hardness.	Lead.	
		Turbidity.	Sediment.	Odor.	Color.	Total.	Fixed.	Free.	Albuminoid	Nitrates.	Nitrites.				
9972	1912 May 27	None	Sl. coarse	Sl. swampy	0.25	.....	....	.0020	.0015	.0030	.0000	.03	.4	....	*

* B. coli present.

Whitefield.—The public water works, owned by the town, were built by private parties in 1892. There are two watersheds of about 30 acres each. The water flows by gravity to a reservoir having a capacity of about 1,000,000 gallons, and is delivered through five miles of cast iron mains, galvanized iron service pipes, to about 300 families, seven eighths of the entire population.

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Examination of Water from Town Supply.

Number.	Date of collection.	Appearance				Residue on Evapo'n		Ammonia		Nitrogen as		Chlorine.	Hardness.	Lead.	
		Turbidity.	Sediment.	Odor.	Color.	Total.	Fixed.	Free.	Albuminoid	Nitrates.	Nitrites.				
7700	1910 Mar. 9	Sl. op.	S. earthy	None	0.10	6.4	2.5	.0002	.0020	.0050	.0000	.10	0.3	....	..
8255	Aug. 2	None	V. slight	Foreign	0.05	4.0	3.4	.0006	.0042	.0100	.0000	.03	0.9	....	*
8989	1911 June 15	None	Black flakes	None	0.10	2.5	1.3	.0010	.0030	.0050	.0000	.05	0.7	....	..
10001	1912 June 5	None	V. slight	None	0.08	3.0	2.5	.0005	.0010	.0300	.0000	.05	0.3	....	..

* B. coli present.

Wilmot.

Examination of Water from Well Supplying Congregational Parsonage.

Number.	Date of collection.	Appearance				Residue on Evapo'n		Ammonia		Nitrogen as		Chlorine.	Hardness.	Lead.	
		Turbidity.	Sediment.	Odor.	Color.	Total.	Fixed.	Free.	Albuminoid	Nitrates.	Nitrites.				
9834	1912 Apr. 17	None	None	None	0.00	.....	....	.0020	.0020	.0100	High	1.10	2.0	....	..

Wilton.—The source of the supply is Mill Brook, with a storage reservoir in Burton Pond, above. There are seven miles of 12-inch iron mains, with galvanized iron service pipes, through which the water is delivered by gravity to about 100 families.

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Examination of Water from Wilton Supply.

Number.	Date of collection.	Appearance				Residue on Evapo'n		Ammonia		Nitrogen as		Chlorine.	Hardness.	Lead.	
		Turbidity.	Sediment.	Odor.	Color.	Total.	Fixed.	Free.	Albuminoid	Nitrates.	Nitrites.				
5771	1908 Oct. 20	Sl. op.	None	None	0.25	3.1	2.1	.0010	.0020	.0000	.0000	.17	1.2	....	..
7891	1910 May 16	V. slight	None	Musk	0.40	2.9	1.5	.0010	.0085	.0025	.0000	.30	0.6	....	..
8502	Oct. 25	None	None	None	0.00	.....	.....	.0010	.0030	.0050	.0000	.08	1.9	....	..
8538	Nov.10	V. slight	None	None	0.30	.....	.....	.0020	.0050	.0025	.0000	.23	1.2	....	*
9209	1911 Aug. 3	Slight	Sl. floc.	Sl. stale	0.25	5.0	3.0	.0010	.0075	.0025	.0000	.08	0.3	....	..
9986	1912 June 3	None	Slight	Sl. marshy	0.50	3.4	2.3	.0010	.0030	.0050	.0000	.14	0.1	....	*

* B. coli present.

Examination of Water from Well of Wilton School District.

8501	1910 Oct. 25	None	None	None	0.05	.....	.....	.0010	.0010	.0500	.0000	.40	3.9	.00	..

Examination of Water from Spring Owned by W. P. Putnam and Others.

8512	1910 Oct. 31	None	None	None	0.05	.....	.....	.0005	.0010	.0050	.0000	.05	1.9	.012	*

* B. coli present.

Examination of Water from Well of Methodist Society.

9924	1912 May 13	V.slight	V. slight	None	0.05	.....	.....	.0020	.0035	.0100	Trace	1.50	3.2	.050	..
10088	June 28	None	None	None	0.05	.....	.....	.0010	.0010	.0100	.0000	1.25	3.2	.010	..

Examination of Water from Well of L. F. Dickinson.

9572	1911 Nov.13	None	V. slight	Sl. foul	0.00	.....	.....	.0050	.0085	.0500	High	2.40	6.7	.000	..

Examination of Water from Spring of Warren H. Estey.

9508	1911 Oct. 26	V.slight	V. slight	Mark. earthy	0.00	.....	.....	.0005	.0015	.0025	.0000	.03	1.4	.100	..

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Wolfeboro.—The public supply, a gravity system, has its source in a pond of about 300 acres. Practically the entire population is supplied.

Examination of Water from Public Supply.

Number.	Date of collection.	Appearance				Residue on Evapo'n.		Ammonia		Nitrogen as		Lead.	Hardness.	Chlorine.	
		Turbidity.	Sediment.	Odor.	Color.	Total.	Fixed.	Free.	Albuminoid	Nitrates.	Nitrites.				
7706	1910 Mar. 9	None	V. slight	None	0.00	2.9	1.5	.0010	.0042	.0050	.0000	.13	.10	....	..
9010	1911 June 20	Slight	Sl. earthy	Sl. veg.	0.05	3.8	1.7	.0010	.0070	.0025	.0000	.12	0.4	....	..
9905	1912 May 9	None	V. slight	None	0.07	3.5	2.0	.0010	.0070	.0050	.0000	.12	1.0	....	..
9906	May 9	Mod.	Sl. coarse	Foreign	0.08	3.4	2.9	.0020	.0095	.0050	.0000	.12	1.0	....	..

Examination of Water from Well Supplying Camp Belknap (State Y. M. C. A.)

9084	1911 July 12	None	None	None	0.05	.....	....	.0040	.0010	.0150	.0000	.20	1.2	....	*
10229	1912 July 22	None	None	Slight	0.00	.....	....	.0010	.0010	.0050	.0000	.10	1.2	....	..

* B. coli present.

A supply owned by the town, furnishing water to about seventy families within the precinct of North Woodstock, is derived from a stream dammed to form a reservoir of about one acre.

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Examination of Water from Supply of North Woodstock.

Number.	Date of collection.	Appearance				Residue on Evapo'n		Ammonia		Nitrogen as		Chlorine.	Hardness.	Lead.	
		Turbidity.	Sediment.	Odor.	Color.	Total.	Fixed.	Free.	Albuminoid	Nitrates.	Nitrites.				
8104	1910 July 13	V.slight	None	None	0.55	2.6	0.8	.0006	.0020	.0025	.0000	.07	0.4	....	..
9006	1911 June 19	None	None	None	0.55	2.9	1.3	.0010	.0060	.0050	.0000	.08	0.4	....	..
9992	1912 June 3	None	None	None	0.35	3.2	1.7	.0006	.0015	.0050	.0000	.05	0.1	....	..

Examination of Water from Spring of the Woodstock Lumber Company.

9362	1911 Aug. 30	Sl. opal	V. Sl.	None	0.20	.....	....	.0015	.0065	.0300	Trace	.10	3.9	....	..
9394	Sept. 2	Moderate	Sl. gelat.	None	0.70	5.9	3.3	.0028	.0052	.1000	.0000	.14	3.3	....	..

Examination of Water from the Spring of the Publishers' Paper Company.

9740	1912 Feb. 20	None	None	Sl. veg.	0.10	.....	....	.0030	.0045	.0050	.0000	.05	1.2	....	..

Respectfully submitted,

CHARLES D. HOWARD,
Chemist.

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SPECIAL REPORTS ON WATER SUPPLIES.

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INSPECTION OF WATER SUPPLIES AT SUMMER HOTELS AND BOARDING HOUSES.

By Charles D. Howard, *Chemist.*

During the summer of 1910 a number of the vacation resorts of the state were visited by the inspector of the board, conditions in connection with the water supply noted and samples collected for analysis. The results of this preliminary investigation were published in the July issue of the *Bulletin* for that year.

During the past season this work has been continued. The following pages include the results of examination of one hundred and eighty-two samples, representing one hundred and eighty supplies, these, with two or three possible exceptions involving re-examinations, being distinct from those previously reported upon.

From the summary it appears that of the total number of samples examined, sixty-six per cent. represented water of acceptable quality, this proportion, by a coincidence, being almost identical with that noted in 1910. It should not be understood from this that one third of the samples examined represented in all cases supplies hopelessly polluted or the use of which for drinking purposes would be attended by risk. On the contrary, in quite a number of instances, it was apparent from the circumstances noted, as well as the analytical data, that the water was inherently of satisfactory quality and that the condition warranting criticism was due to lack of proper protection or care, or to other temporary causes of more or less easily remediable nature. In all such cases, as well as in those where permanent pollution by drainage was found to exist, the proprietor was notified of the facts, advised as to what to do, and warned as to the necessity, either of abandonment or of improvement of the supply in question.

Occasionally we have found that a condition of pollution was due to some unusual circumstance. A conspicuous example of this is in connection with a supply, the analysis of which indicated an exceedingly high content of chlorides (salt). It subsequently appeared that the emptying near the well of the salt from ice-cream freezing was responsible, and it was suggested that under these circumstances no objection should be raised to the continued public use of this supply. However, as the analysis was not altogether favorable in other respects and as the circumstance necessarily involved an objectionable condition in connection with a water supply, this suggestion was not countenanced, it being requested that public use be discontinued pending attainment of normal quality.

Failure of a supply to pass muster is not necessarily due to its affording a bad analysis. In three or four cases supplies giving analyses that might allow of their being passed, under favorable local conditions, were rejected because such conditions were observed to be bad or, in our opinion, unsafe.

STANDARD OF QUALITY REQUIRED.

While we may be exposed to the occasional criticism that our judgments as to quality are somewhat severe, yet we have preferred to take the position that, New Hampshire being blessed with such an abundant distribution of the best water in existence, the "summer boarder" who comes to us for rest and recuperation rightly

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expects and is entitled to have a drinking supply that is not only wholly above suspicion as to purity but, wherever possible, is up to the high average of excellence which this state sustains.

For this reason, the use of what may be termed "purified" water—*i.e.*, polluted ground water that has been subsequently in a measure clarified through natural soil filtration—has been discountenanced. Even in those cases where the occurrence of excessive quantities of nitrates, etc., may be attributed to garden drainage, and use of the water therefore probably "safe," so far as danger of any specific infection is concerned, there are conditions when the ingestion of such nitrated waters is distinctly inadvisable. Manifestly, such water is not pure water, in the proper sense, and it is not the sort of water that the summer resort proprietor ought to be contented with supplying.

INTERPRETATION OF ANALYSES.

With regard to the interpretation of the following analytical data, it may be stated that this cannot be safely done by the layman, except where the condition indicated by the analysis is either very good or very gross. The significance of the various elements will be found discussed in detail in the earlier bulletin. Following is given the approximate range exhibited by New Hampshire well and spring waters not subject to any contaminative influences and located twenty-five miles or more from tide-water. The lower limits may be taken as typical of the results commonly afforded by our mountain springs. *It should be distinctly understood that it by no means follows because a given water fails to come within this range in one or more of the specifications, that such water is unfit or unsafe.* As an instance of the necessity of taking all the attending facts into consideration, it may be mentioned that harmless amounts of nitrites and ammonia frequently result from the action of the nitrates in the water upon new galvanized pipe.

	Parts in 100,000
Free and albuminoid ammonias	0.0005—0.0020
Nitrites	none
Nitrates (no garden drainage)	0.003—0.025
Chlorine " " "	0.03—0.50
Hardness (absence heavy clay or limestone soil)	0.4—3.0°
Color	0.00—0.10
Odor	none—slight earthy
Turbidity	none—very slight
Sediment	none—slight earthy
Lead (dangerous)	0.050 plus
Lead (appreciable test but regarded as "safe")	0.025
Lead (inappreciable trace)	0.010

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WATER SUPPLIES OF SUMMER

(Analytical figures

Number.	Town.	Name of House.	Name of Owner.	Source.	Pipe.
10257	Andover	Hotel Potter	H. Hopkins	W	Iron
10171	Auburn	The Elms	T. S. Emery	W	
10172	Auburn	Lakeside Farm	W. A. Haselton	S	
10173	Auburn	Island View Farm	E. P. Tilton	W	
10174	Auburn	Bay View House	G. M. Hunkins	S	Lead
10175	Auburn	Oak Farm	L. E. Emery	S	Lead
10176	Auburn	The Winthrop	Joseph Gilman	W	Galv. iron
10179	Auburn	Grant House	J. F. Grant	W	Tin l. lead
10182	Auburn	Pine Bluff House	L. Hall	S	Lead
10360	Bethlehem	Willow Farm	F. P. Cheney	S	Lead
8363	Bradford	Meadow Brook Farm	J. W. Cressey	W	Wood
8365	Bradford	Sunset Hill Farm	J. N. Ansort	S	Lead
8366	Bradford	Eaton House	Mrs. Alice M. Eaton	W	
8364	Bradford	Woodside	R. W. Cummings	S	Galv. iron
8367	Bradford	Norman Villa	B. A. Messer	W	Galv. Iron
8368	Bradford	Pleasant View Farm	E. C. Messer	S	Lead
8369	Bradford	Bradford Hotel	R. B. Shore	S	Lead
8370	Bradford	Gillis House	Charles Gillis	S	Lead
8371	Bradford	The Bellevue	H. B. Wood	W	Galv. iron
*8372	Bradford	Bradford Springs Hotel	S. W. Bowman	S	
10265	Bridgewater	Pasquaney Inn	C. P. Fifield & Son	S	Galv. iron
10280	Bristol	Pleasant View Farm	S. T. Eisnor	W	Wood
10266	Bridgewater	Brookside Inn	G. T. Young	Lake	Galv. iron
10268	Bridgewater	Elm Farm	H. Pothecary	S	Galv. iron
10281	Bristol	Elm Tree Farm	G. B. Cremore	S	Lead
10279	Bristol	Lakeview Farm	J. E. Mitchell	W	Lead
10267	Bristol	Akerman House	F. L. Akerman	W	Lead & galv.
10285	Canaan		F. L. Sawtelle	W	
10284	Canaan	Lucerne House	W. B. Hinkley	W	
10283	Canaan	Lakeside Inn	H. L. Prescott	W	Lead
10289	Canaan	Bonny View Farm	A. B. Howe	W	Iron
10136	Campton		M. N. Davis	S	
10194	Campton	The Pinecroft	Mrs. Anna Lougee	S	
10143	Campton	The Maples	Mrs. C. G. Avery	S	Lead
10217	Canterbury	Birchdale Farm	W. W. Wheeler	W	Lead
10214	Canterbury		J. W. Driscoll	W	Lead
10213	Canterbury	Maple Knolls	E. B. Peverly	W	Lead
10215	Canterbury	Hancock House	N. W. Morgan	W	Wood
10212	Canterbury	The Hancock	N. W. Morgan	S	
10216	Canterbury	Pleasant View	J. S. Peverly	S	Lead
10218	Canterbury	Osgood Farm	L. I. Chase	W	Iron
10338	Carroll (Twin Mt.)	McMillan House	Mrs. D. McMillan	S	Iron galv
10336	Carroll	Rosebrook Inn	J. F. Whalen	S	Lead galv
10335	Carroll	The Maples	J. A. Mulleavey	S	Lead, galv.
10339	Carroll	Twin Mountain House	Barron, Merrill & Barron	S	Galv. iron
9337	Center Harbor	Mallord Cottage	Mrs. Jennie Groves	S	Tin-l. lead
9347	Center Harbor	Garnet Inn	A. A. Bennett	S	Tin-l. lead
9332	Center Harbor	Oak Corner	Tony Mobile	W	Galv. iron
9329	Center Harbor	Mallord Cottage	Mrs. Jennie Graves	W	
9331	Center Harbor	Camp Tecumseh	Orton & Grant	Lake	Galv. iron
9323	Center Harbor		S. C. Kelley	Well	
9319	Center Harbor	Pine Hill Rest	Mrs. Belle Hanson	S	
9320	Center Harbor	Fairmount Cottage	C. A. Green	S	
9336	Center Harbor	Hanson Farm	Charles Hanson	S	
9491	Center Harbor	Neck Road	Mrs. Mason	W	
9607	Center Harbor	New Cambridge	R. D. Green	W	Galv. iron
10080	Center Harbor	Restaurant	A. Amabile	W	
10185	Chester	Home Nook	Mrs. J. M. Towle	W	Galv. iron
10184	Chester	Merrill House	A. J. Merrill	W	
10183	Chester	Hall House	Mrs. H. A. Hall	W	
10178	Chester	Pleasant View Farm	Mrs. F. I. Hutchins	W	

* Known as Bradford Sulphur Spring. While the sulphur odor is distinct at the spring, the sample received at the laboratory afforded neither odor nor reaction for sulphides.

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HOTELS AND BOARDING HOUSES.

represent parts per 100,000.)

Number.	Date of Collection.	Appearance.				Ammonia.		Nitrogen as		Chlorine.	Hardness.	Lead.
		Turbidity.	Sediment.	Odor.	Color.	Free.	Albuminoid.	Nitrates.	Nitrites.			
10257	July 23,'12	None....	V. slight ...	None....	0.00	.0010	.0010	.0050	.0000	0.10	1.9	.....
10171	July 15,'12	Sl. opal..	V. slight ...	Sl. clay ..	0.10	.0060	.0020	.0500	High	1.35	3.6	.....
10172	July 15,'12	None....	V. slight ...	None....	0.05	.0010	.0010	.0100	.0000	0.45	1.9	.....
10173	July 15,'12	None....	None.....	S. earthy.	0.05	.0020	.0010	.0100	High	4.60	6.7	.....
10174	July 15,'12	None....	V. slight ...	None....	0.05	.0005	.0010	.0100	.0000	0.10	1.4	.075
10175	July 15,'12	None....	None.....	None....	0.05	.0020	.0020	.5000	.0000	7.40	12+	.020
10176	July 15,'12	Sl. opal..	Sl. floc.....	Slight ...	0.10	.0020	.0010	.0750	Trace	2.60	2.6	.....
10179	July 15,'12	None....	None.....	None....	0.05	.0020	.0010	.0050	.0000	0.10	1.9	.010
10182	July 15,'12	None....	V. slight ...	None....	0.05	.0005	.0010	.0100	.0000	0.10	1.9	.100
10360	Aug. 9,'12	None....	None.....	None....	0.00	.0005	.0005	.0030	.0000	0.03	1.7	.010
8363	Aug. 30,'10	None....	V. slight ...	None....	0.00	.0020	.0010	.0350	.0000	0.55	1.9	.....
8365	Aug. 30,'10	Sl. opalesc	V. slight ...	Sl. marshy	0.05	High	.0060	.0100	.0000	0.08	1.9	.000
8366	Aug. 30,'10	None....	V. slight ...	Sl. foul...	0.00	.0010	.0010	.1500	.0000	0.75	4.6	.....
8364	Aug. 30,'10	None....	None.....	None....	0.00	.0005	.0016	.0150	.0000	0.05	1.9	.....
8367	Aug. 30,'10	Sl. fibrous	Slight	Sl. marshy	0.05	.0010	.0020	.0050	.0000	0.10	1.7	.....
8368	Aug. 30,'10	None....	Moderate ..	None....	0.00	.0007	.0010	.0050	.0000	0.03	1.4	High
8369	Aug. 30,'10	None....	None.....	None....	0.00	.0010	.0010	.0050	.0000	0.10	1.2	High
8370	Aug. 30,'10	None....	Mod. earthy	None....	0.05	.0010	.0050	.0030	.0000	0.05	1.9	V. high
8371	Aug. 30,'10	None....	V. slight ...	Sl. veg...	0.00	.0020	.0010	.0100	.0000	0.20	2.0	.....
*8372	Aug. 30,'10	Mod. opal	V. slight ...	None....	0.55	.0020	.0020	.0050	.0000	0.08	2.6	.....
10265	July 25,'12	Vs. opal..	Slight	None....	0.00	.0010	.0010	.0030	.0000	0.05	2.6	.....
10280	July 25,'12	None....	None.....	None....	0.00	.0010	.0010	.2500	.0000	2.00	5.3	.....
10266	July 25,'12	V. slight .	V. slight ...	Slight....	0.07	.0010	.0010	.0030	.0000	0.05	0.1	.....
10268	July 25,'12	V. slight .	V. slight ...	V. slight .	0.00	.0005	.0005	.0030	.0000	0.05	0.3	.....
10281	July 25,'12	Ft. opal..	Slight	Sl. veg...	0.00	.0005	.0005	.0030	.0000	0.05	1.9	.010
10279	July 25,'12	None....	None.....	None....	0.00	.0005	.0005	.0030	.0000	0.03	0.9	.020
10267	July 25,'12	None....	None.....	None....	0.00	.0010	.0010	.1250	Trace	1.90	3.9	.000
10285	July 26,'12	Sl. opal. .	Slight.....	None....	0.00	.0010	.0010	.0100	.0000	0.65	6.0	.....
10284	July 26,'12	None....	V. slight ...	None....	0.00	.0015	.0010	.0350	.0000	0.20	4.6	.....
10283	July 26,'12	None...	None.....	None....	0.07	.0010	.0015	.3000	.0000	4.60	5.3	.020
10289	July 26,'12	Mod. opal	Mod. floc..	Sour.....	0.15	.0110	.0020	.0500	Trace	0.10	1.9	.....
10136	July 10,'12	None....	V. slight ..	None....	0.05	.0010	.0010	.0200	.0000	0.50	1.9	.....
10194	July 11,'12	None. ..	Sl. earthy ..	None....	0.05	.0005	.0010	.0030	.0000	0.05	0.4	.....
10143	July 11,'12	None....	Sl. floc.....	None....	0.05	.0005	.0010	.0030	.0000	0.03	0.4	0.050
10217	July 18,'12	V. slight .	None.....	V. slight .	0.03	.0005	.0010	.0050	.0000	0.05	1.9	0.010
10214	July 18,'12	V. slight .	None.....	V. slight .	0.03	.0010	.0010	.1500	.0000	1.45	2.0	0.010
10213	July 18,'12	None....	None.....	V. slight.	0.05	.0010	.0020	.3000	High	8.90	12+	0.010
10215	July 18,'12	None....	V. slight ...	None....	0.05	.0010	.0020	.0100	High	0.40	2.6	.....
10212	July 18,'12	V. slight .	V. slight ...	None....	0.05	.0020	.0040	.0500	.0000	1.65	2.6	.....
10216	July 18,'12	V. slight .	Sl. gelat. ...	Sl. foul ..	0.05	.0010	.0090	.0050	.0000	0.15	2.4	.100
10218	July 18,'12	None....	None.....	None....	0.03	.0010	.0010	.3000	.0000	4.10	8.1	.....
10338	Aug. 6,'12	None....	None.....	None....	0.00	.0005	.0005	.0050	.0000	0.03	1.9	.....
10336	Aug. 6,'12	None....	V. slight ...	None....	0.25	.0005	.0010	.0030	.0000	0.03	0.6	.010
10335	Aug. 6,'12	None....	None.....	None....	0.00	.0005	.0005	.0030	.0000	0.03	0.9	.020
10339	Aug. 6,'12	None....	None.....	None....	0.03	.0005	.0005	.0030	.0000	0.30	0.7	.....
9337	Aug. 28,'11	None....	None.....	Slight ...	0.00	.0010	.0010	.0200	.0000	0.07	1.7	.000
9347	Aug. 28,'11	.....	.....	.....	.....	.....	.....	.....	.....	.....	....	.1000
9332	Aug. 28,'11	Sl. opal..	V. slight ...	None....	0.00	0.0020	.0020	.0500	.0000	10+	9.6	.....
9329	Aug. 28,'11	Mod. opal	Sl. earthy ..	None....	0.05	.0010	.0020	.0300	V.high	2.80	6.7	.....
9331	Aug. 28,'11	V. slight .	V. slight ...	Sl. earthy	0.10	.0010	.0010	.0050	.0000	0.07	0.4	.....
9323	Aug. 28,'11	Mod. opal	Slight	Sl. earthy	0.05	.0015	.0035	.0200	High	3.00	7.4	.....
9319	Aug. 22,'11	Mkd. opal	Much earthy	None....	0.25	.0070	.0065	.0050	.0000	0.25	2.2	.....
9320	Aug. 28,'11	None....	None.....	None....	0.05	.0010	.0015	.0100	.0000	0.30	1.4	.....
9336	Aug. 28,'11	None....	None.....	None....	0.00	.0005	.0010	.0100	.0000	0.07	2.6	.....
9491	Oct. 7,'11	Mod. opal	Sl. fibrous ..	M. earhty	0.30	V.high	.0105	.0200	High	0.15	2.6	.....
9607	Dec. 5,'11	Mod. opal	Sl. earthy ..	M. earthy	0.10	.0020	.0035	1.0000	High	5.20	8.7	.....
10080	June 26,'12	Mod. opal	Mod, earthy	Sl. earthy	0.45	.0015	.0090	.0100	.0000	2.40	5.3	.....
10185	July 15,'12	Mod. opal	Slight	Slight ...	0.20	.0010	.0030	.0100	.0000	0.10	1.9	.....
10184	July 15,'12	Sl. opales.	Moderate ..	None....	0.10	.0010	.0010	.0050	.0000	0.10	2.0	.....
10183	July 15,'12	Sl.opalesc.	Moderate ..	Slight ...	0.05	.0010	.0020	.0050	.0000	0.55	1.9	.....
10178	July 15,'12	V. slight .	Slight	None....	0.05	.0010	.0010	.0100	.0000	0.50	3.9	.....

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WATER SUPPLIES OF SUMMER

(Analytical figures

Number.	Town.	Name of House.	Name of Owner.	Source.	Pipe.
10181	Chester	Hooke House	George Hooke	W	Lead
10180	Chester	Highland Farm	A. A. Bean	W	
10429	Conway	Range View Farm	S. Littlefield	W	Wood
10428	Conway	The Arcadian	Mrs. M. E. McIntyre	S	Galv. iron
10198	Derry	Cottages opp. Breesy Point	William Neller	W	Galv. iron
10199	Derry	Wentworth Lodge	G. S. Jones	S	Galv. iron
10200	Derry	Hillside Farm	Mrs. Cole	W	
10201	Derry	Lake View House	Mrs. M. E. Morton	W	Galv. iron
10203	Derry	Beaver Lake House	F. W. Tucker	W	
10202	Derry	Lakeside Farm	Mrs. L. C. Bockman	S	Lead (?)
10249	Elkins	Cliff House	Mrs. G. R. McFarland	S	
10291	Enfield	Lake View Hotel	A. E. Sargent	S	Galv. iron
10290	Enfield	Oak View Cottage	Samuel Carlton	W	Galv. iron
10287	Enfield	The Fairview	W. A. Saunders	S	Lead
10286	Enfield	Crystal Lake Farm	G. H. Lake	W	Galv. iron
10288	Enfield	Mascoma Heights House	I. C. Stratton	S	Lead
9946	Fitzwilliam	Laurel Lake Inn	E. P. Sargent, Jr.	W	
8384	Fitzwilliam	Laurel Lake Inn	E. P. Sargent, Jr.	W	
8383	Fitzwilliam	Laurel Lake Farm	W. H. S. Whipple	W	Wood
8387	Fitzwilliam	Grand View Farm	Arthur T. Byam	W	
8385	Fitzwilliam	Lake View Farm	George E. Fletcher	S	
9159	Franconia	Forest Hill Hotel		W	Galv. iron
9179	Franconia	Forest Hill Hotel		S	
10264	Hebron	Hillside Inn	George Smith	S	Lead
10223	Contoocook	Roberts Cottage	Annie E. Roberts	W	Iron
10226	Contoocook	Roll Pond House	J. M. Hook	W	Lead
10227	Contoocook	Riverbank Cottage	Mrs. J. B. Lucie	W	Lead
10228	Contoocook	Mt. Lookout House	Mrs. Ella Cherry	S	Iron
10225	Contoocook	Meadowbrook Farm	Mrs. F. J. Pierce	W	Galv. iron
10234	Contoocook	The Pines	L. A. Newell	W	Wood
8380	Jaffrey	Maple Lawn House	Mrs. J. T. Brown	W	Galv. iron
8381	Jaffrey	The Ark	J. H. Poole & Son	S	Iron
8382	Jaffrey	Maple Retreat	C. A. Sawyer	W	Block tin
8386	Jaffrey	Mountain Shack House	B. Caldwell	S	Galv. iron
10343	Jefferson	Grandview House	Mrs. Emma Harris	Str	Galv. iron
10344	Jefferson	Waumbeck (Spr. No. 1)	C. V. Murphy, Mgr.	S	Galv. iron
10345	Jefferson	Brookside Cottage	Mrs. Josie Holmes	S	Galv. iron
10346	Jefferson	Waumbeck (Spr. No. 2)	C. V. Murphy, Mgr.	S	
10347	Jefferson	Pliny Range House	W. A. Crawford	S	Galv. iron
10351	Jefferson	Mt. Adams House	John W. Crawshaw	S	Galv. iron
10353	Jefferson	Cloverdale Cottage	L. B. Keniston	S	Galv. iron
10354	Jefferson	Cold Spring House	W. H. Crawford	S	Galv. iron
10355	Jefferson	Highland House	J. L. Pottle & Son	S	Galv. iron
10356	Jefferson	Hillside Farm	W. F. Davenport	S	Galv. iron
10361	Littleton	Wheeler Hill Cottage	J. R. Lyster	S	Galv. iron
10364	Littleton	Dexter Farm	Warren Dexter	W	Lead
10193	Londonderry	Barrett Farm	W. E. Barrett	S	Log
10195	Londonderry	Ferndale Farm	William McKay	W	Galv. iron
10196	Londonderry	Glenwood Farm	W. B. Mack	W	Galv. iron
10197	Londonderry	Warwick Hall	Dr. A. B. Wark	W	Lead
10422	Madison	Lakeview Cottage	David Knowles	S	Galv. iron
10423	Madison	Lakeside House	W. Kennett	W	Galv. iron
10424	Madison	The Majors	J. O. Gerry & Son	S	Galv. iron
10425	Madison	Churchill House	S. E. Churchill	S	Galv. iron
10248	New London	The Homestead	H. E. Messer	W	Galv. iron
10251	New London	The Brocklebank	Fred B. Gay	S	Iron
10250	New London	The Glensae	Mrs. Anna Gay	W	
10252	New London	Pleasant View	E. F. Messer	S	Galv. iron
10254	New London	The Cranehurst	A. O. Crane	W	Wood
10341	New London	The Cranehurst	A. O. Crane	W	
10256	New London	McFarland Cottage	Mrs. Laura McFarland	S	Lead

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HOTELS AND BOARDING HOUSES.

represent parts per 100,000.)

Number.	Date of Collection.	Appearance.				Ammonia.		Nitrogen as		Chlorine.	Hardness.	Lead.
		Turbidity.	Sediment.	Odor.	Color.	Free.	Albuminoid.	Nitrates.	Nitrites.			
10181	July 15,'12	Sl. opalesc	None.....	None....	0.05	.0010	.0010	.0050	.0000	0.35	1.9	.010
10180	July 15,'12	None....	V. slight...	None....	0.05	.0010	.0020	.0200	.0000	7.50	8.9	.....
10429	Aug. 28,'12	None....	Sl. floc.	None....	0.00	.0005	.0005	.0050	.0000	0.10	1.2	.....
10428	Aug. 28,'12	None....	Sl. floc.	None....	0.00	.0005	.0005	.0030	.0000	0.03	1.9	.....*
10198	July 16,'12	Slight ...	None.....	V. slight .	0.05	.0010	.0020	.0500	.0000	1.10	2.6	.....
10199	July 16,'12	Sl. opalesc	None.....	Earthy ..	0.07	0080	.0010	.0200	Trace	0.30	4.0	.....*
10200	July 16,'12	V. slight..	V. slight ...	Foul....	0.05	.0040	.0020	.0100	.0000	0.20	2.5	.....
10201	July 16,'12	None....	Slight	Slight ...	0.05	.0020	.0010	.0100	Trace	0.15	3.9	.....
10203	July 16,'12	None....	None.....	None....	0.05	.0010	.0010	.2500	High	16.50	12+	.....
10202	July 16,'12	V. slight .	V. slight ...	None....	0.05	.0005	.0010	.0050	.0000	0.10	2.6	.010
10249	July 23,'12	None....	Sl. floc.	None....	0.05	.0010	.0010	.0030	.0000	0.08	1.2	.....
10291	July 26,'12	None....	None.....	None....	0.00	.0005	.0005	.0030	.0000	0.05	1.4	.....
10290	July 26,'12	None....	None.....	None....	0.00	.0005	.0010	.0050	.0000	0.45	1.9	.....
10287	July 26,'12	None....	Mod. floc...	Veg.....	0.00	.0065	.0035	.0050	.0000	0.03	1.9	.020
10286	July 26,'12	Sl. opalesc	V. slight ...	Mkd. veg.	0.05	.0025	.0010	.0030	.0000	0.10	4.6	.....
10288	July 26,'12	None....	V. slight ...	None....	0.05	.0005	.0005	.0500	.0000	0.18	1.3	.060
9946	May 20,'12	None....	V. slight ...	None....	0.03	.0010	.0030	.0050	.0000	0.03	2.0	.....
8384	Sept. 3,'10	None....	V. slight ...	None....	0.00	.0010	.0050	.4500	Trace	1.10	3.9	.....†
8383	Sept. 1,'10	None....	V. slight ...	None....	0.20	High	High	1.0000	High	7.9	8.1	.....
8387	Sept. 1,'10	Moderate	Mod. floc...	None....	0.10	V.high	High	.4500	V.high	0.60	5.3	.....
8385	Sept. 1,'10	V. slight .	Slight	None....	0.05	.0010	High	.0150	Trace	0.08	1.2	.....
9159	July 25,'11	Sl. opalesc	V. slight ...	None....	0.10	.0010	.0025	.0050	.0000	0.20	1.9	.....
9179	July 27,'11	None....	Slight	None....	0.05	.0010	.0010	.0300	.0000	0.90	2.6	.....
10264	July 25,'12	V. slight	None.....	None....	0.00	.0005	.0005	.0100	.0000	0.05	1.9	.010
10223	July 19,'12	Sl. opalesc	Sl. iron	Earthy ..	0.10	.0010	.0010	.0175	Trace	0.55	1.9	.....
10226	July 19,'12	Sl. opalesc	None.....	Sl. earthy	0.10	.0005	.0005	.0030	.0000	0.08	1.9	.075
10227	July 19,'12	None....	None.....	Sl. earthy	0.05	.0010	.0010	.0300	.0000	1.10	2.6	.040
10228	July 19,'12	None....	V. slight ...	None....	0.05	.0005	.0010	.0050	.0000	0.03	1.7	.....
10225	July 19,'12	None....	V. slight ...	None....	0.05	.0015	.0010	.0050	Trace	0.50	2.6	.....*
10234	July 19,'12	None....	V. slight ...	None....	0.05	.0010	.0015	.2000	.0000	1.10	2.6	.....
8380	Sept. 1,'10	V. slight .	None.....	None....	0.05	.0010	.0065	.0050	.0000	0.10	1.9	.....
8381	Sept. 1,'10	None....	None.....	None....	0.00	.0005	.0010	.0030	.0000	0.05	1.2	.....
8382	Sept. 1,'10	None....	None.....	None....	0.00	.0010	.0020	.5000	.0000	1.00	3.9	.....
8386	Sept. 1,'10	Slight ...	Mod. floc. .	None....	0.10	High	.0020	.0050	Trace	0.05	1.9	.....‡
10343	Aug. 7,'12	None....	Sl. earthy ..	None....	0.05	.0005	.0005	.0050	.0000	0.03	1.1	.....
10344	Aug. 7,'12	None....	V. slight ...	None....	0.10	.0005	.0005	.0050	.0000	0.03	0.6	.....
10345	Aug. 7,'12	None....	V. slight ...	None....	0.07	.0005	.0005	.0030	.0000	0.03	0.6	.....
10346	Aug. 7,'12	None....	None.....	None....	0.00	.0005	.0005	.0030	.0000	0.03	0.6	.....
10347	Aug. 7,'12	None....	None.....	None....	0.07	.0010	.0010	.0056	.0000	0.05	1.2	.....
10351	Aug. 7,'12	None....	S. floc.....	None....	0.00	.0005	.0010	.0050	.0000	0.05	1.7	.....
10353	Aug. 7,'12	None....	V. slight ...	None....	0.00	.0005	.0005	.0050	.0000	0.05	2.6	.....
10354	Aug. 7,'12	None....	None.....	None....	0.00	.0005	.0005	.0050	.0000	0.03	1.2	.....
10355	Aug. 7,'12	None....	None.....	None....	0.03	.0005	.0005	.0050	.0000	0.05	1.7	.....
10356	Aug. 7,'12	None....	V. slight ...	None....	0.00	.0005	.0005	.0050	.0000	0.05	1.7	.....
10361	Aug. 9,'12	None....	V. slight ...	None....	0.00	.0005	.0005	.0030	.0000	0.05	1.9	.....
10364	Aug. 9,'12	V. slight .	Mod. floc. .	None....	0.00	.0005	.0005	.0030	.0000	0.05	0.4	.050
10193	Aug. 16,'12	None....	None.....	V. slight .	0.10	.0005	.0010	.0050	.0000	0.10	1.9	.....
10195	Aug. 16,'12	None....	None.....	None....	0.00	.0010	.0020	.1000	.0000	1.25	4.6	.....
10196	Aug. 16,'12	None....	None.....	None....	0.07	.0010	.0020	.2500	.0000	2.10	6.7	.....
10197	Aug. 16,'12	None....	None.....	Slight....	0.05	.0010	.0010	.0050	.0000	0.55	5.0	.040
10422	Aug. 29,'12	None....	V. slight ...	None....	0.00	.0005	.0005	.0030	.0000	0.05	1.9	.....
10423	Aug. 29,'12	None....	None.....	None....	0.00	.0005	.0010	.0600	.0000	0.40	1.4	.....
10424	Aug. 29,'12	None....	None.....	None....	0.00	.0005	.0005	.0030	.0000	0.03	1.2	.....
10425	Aug. 29,'12	Mod. floc.	Sl. floc.	None....	0.05	.0005	.0005	.0030	.0000	0.05	4.2	.....*
10248	July 23,'12	None....	V. slight ...	None....	0.05	.0010	.0020	.0100	Trace	2.50	5.3	.....
10251	July 23,'12	None....	Mod. floc. .	None....	0.00	.0010	.0010	.0100	.0000	1.10	3.9	.....
10250	July 23,'12	V. slight .	V. slight ...	None....	0.00	.0010	.0010	.0050	.0000	0.40	0.4	.....
10252	July 23,'12	None....	None.....	None....	0.05	.0005	.0010	.0050	.0000	0.10	1.9	.....§
10254	July 23,'12	None...	V. slight ...	None...	0.05	.0010	.0030	.0100	High	15+	10.3	.....
10341	Aug. 7,'12	None....	V. slight ...	Sl. earthy	0.05	.0010	.0035	.0100	High	16.0	12.4	.....
10256	July 23,'12	None....	None.....	None....	0.05	.0005	.0010	.0030	.0000	0.10	1.9	.050

* Zinc 0.4 parts.
† Source of No. 9946 now used as drinking water supply.
‡ Zinc, 0.5 parts.
§ Salt from ice cream freezers said to be deposited near well.

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WATER SUPPLIES OF SUMMER

(Analytical figures

Number.	Town.	Name of House.	Name of Owner.	Source.	Pipe.
10258	New London	King Hill House	Elmer Messer	W...	Galv. iron..
10259	New London	Lakeside House	George S. Prescott	S....	Iron.....
10261	New London	Twin Lake Villa	Henry W. Kidder	Str.	Galv. iron..
10262	New London	Red Gables	W. A. Messer & Sons	S....	Galv. iron..
8388	Newport	Mountainview Farm	A. E. Sargent	S....	Lead & cem.
10442	Ossipee	Maple Hurst Farm	Mrs A. D. Leighton	W...	Galv. iron..
10443	Ossipee	Hodgdon Farm	Mrs. A. A. Spear	W...	Galv. iron..
10444	Ossipee	Pocket Mt. Farm	H. P. Harding	W...	.....
10445	Ossipee	Carroll Inn	W. E. Wiggin	S....	Galv. iron..
10447	Ossipee	The Cloudland	W. S. Chase	W...	Galv. iron..
10129	Plymouth	Intervale Farm	Ahern & Son	S....	.....
10130	Plymouth	.....	D. P. Pollard	S....	Lead.....
10138	Plymouth	Mountainview	Daniel A. Sawyer	W...	Tin .....
10139	Plymouth	Riverview	C. H. Schofield	W...	.....
10349	Randolph	Mt. Crescent House	J. O. George, Mgr.	Str.	Galv. iron..
10350	Randolph	Mt. View House	S. A. Boothman	S....	Galv. iron..
10352	Randolph	Ravine House	C. B. Bridgman, Mgr.	S....	Galv. iron..
9121	Rye Beach	Ocean Wave House	H. E. Putnam Company	W...	Galv. iron..
9514	Rye Beach	Farraget House	W. E. Carter	W...	Wood.....
10433	Tamworth	Wonolancet Farm	Arthur T. Walden	S....	Galv. iron..
10434	Tamworth	Arling Farms Lodge	Frank Arlings	W...	Galv. iron..
10435	Tamworth	The Ferncroft	E. L. Fisher	Str.	.....
10436	Tamworth	Mt. Park Cottage	George H. Huntress	W...	.....
10437	Tamworth	Swift River House	H. L. Wiggin	W...	Galv. iron..
10438	Tamworth	Camp Chocorua	S. G. Davidson	Sp...	Galv. iron..
10439	Tamworth	The Pines on the Hill	A. W. Fisher	W...	Galv. iron..
10108	Tamworth	Camp Chocorua	S. G. Davidson	Sp...	Galv. iron..
10431	Tamworth	The Maples	C. P. Johnson	S....	Galv. iron..
10432	Tamworth	The Maplehurst	F. H. Earle	S....	Galv. iron..
10378	Tamworth	Boarding House	John Hayford	W...	Galv. iron..
10137	Thornton	Echo House	C. H. Abbott	S....	Lead.....
10141	Thornton	The Outlook	C. B. Ham	S....	Galv. iron..
10142	Thornton	Mt. Kineo House	L. N. Brown	S....	Lead.....
8399	Tuftonboro	Horne Farm	Mrs. F. E. Horne	W...	.....
8389	Unity	Sunrise Farm	C. A. Newton	W...	Galv. iron..
8354	Warner	Burnt Hill Farm	M. M. Fisher	S....	Galv. iron..
8355	Warner	Mountainview Farm	B. C. Flanders	S....	Wood .....
8356	Warner	Elm Farm	W. Sargent	W...	.....
8357	Warner	Fairview	D. S. Harriman	W...	Galv. iron..
8358	Warner	Pleasant View Farm	F. A. Chase	W...	Lead.....
9352	Warner	Fairview	D. S. Harriman	W...	Galv. iron..
10233	Warner	The Glendon	H. J. Bean	S....	Lead.....
10158	Warren	Sunrise Farm	George N. Boynton	S....	Lead.....
10160	Warren	Hillside House	George C. Eastman	W...	.....
10161	Warren	Moosilauke Inn	W. F. Adams, Mgr.	S....	Lead (?) ...
10162	Warren	Merrill's Mountain House	M. T. Clement	W...	.....
10164	Warren	Bailey's Tavern	J. F. Bailey	S....	Lead.....
9655	Weare	Breed Farm	E. C. Breed	W...	.....
10224	Webster	Breezy Hill Farm	F. V. Thompson	W...	Wood.....
10155	Wentworth	Maple Cottage	F. D. Ellsworth	S....	Lead.....
10156	Wentworth	Mountain View Farm	P. B. Williams	S....	.....
10157	Wentworth	Burnham House	I. M. Burnham	S....	Lead.....
10159	Wentworth	Mt. Carr House	Mrs. Ellen Pillsbury	W...	Galv. iron..
10163	Wentworth	Webster House	F. E. Webster	S....	Lead.....
10330	Whitefield	Locust Cottage	E. H. Parker	S....	Lead.....
10331	Whitefield	Overlook House	A. W. Bowles	S....	Galv. irob..
10332	Whitefield	Mountain View House	W. F. Dodge & Sons	W...	Galv. iron..
10333	Whitefield	Grand View Cottage	Mrs. A. B. Colby	W...	Lead.....
10334	Whitefield	Pondcherry Lodge	Merrill Bros.	S....	Galv. iron..
10253	Wilmot	Traveller's Retreat	Charles Chadwick	W...	.....
10260	Wilmot	The Howlett	Mrs. John C. Howlett	W...	Lead.....

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HOTELS AND BOARDING HOUSES.

represent parts per 100,000.)

Number.	Date of Collection.	Appearance.				Ammonia.		Nitrogen as		Chlorine.	Hardness.	Lead.
		Turbidity.	Sediment.	Odor.	Color.	Free.	Albuminoid.	Nitrates.	Nitrites.			
10258	July 23,'12	Mod.opal.	Slight	V. slight .	0.05	.0010	.0010	.0350	Trace	0.35	1.9	.....
10259	July 23,'12	Sl. opalesc	Sl. floc.	None....	0.00	.0005	.0005	.0030	.0000	0.05	0.4	.....
10261	July 23,'12	V. slight .	Mod. floc...	None....	0.60	.0010	.0020	.0030	.0000	0.05	0.4	.....
10262	July 23,'12	None....	V. slight ...	None....	0.05	.0005	.0005	.0100	.0000	0.05	1.7	.....
8388	Aug. 31,'10	None....	None.....	None....	0.00	.0010	.0010	.0150	.0000	0.03	1.9	.000
10442	Aug. 30,'12	V. slight .	V. slight...	Slight ...	0.00	.0010	.0005	.0030	.0000	0.05	1.4	.....
10443	Aug. 30,'12	Mod. opal	Mod. earthy	Earthy ..	0.00	.0010	.0010	0.2500	.0000	0.45	3.2	.....
10444	Aug. 30,'12	V. slight .	V. slight ...	V. slight .	0.00	.0010	.0010	.0030	.0000	0.65	1.2	.....
10445	Aug. 30,'12	None....	V. slight ...	Sl. earthy	0.00	.0010	.0010	.3000	High	8.60	5.4	.....*
10447	Aug. 30,'12	V. slight .	Slight	Foul.....	0.00	.0090	.0020	.0200	.0000	0.60	1.2	.....
10129	July 10,'12	V. slight .	V. slight ...	Earthy ..	0.05	.0005	.0010	.0030	.0000	0.05	1.2	.....
10130	July 10,'12	None....	None.....	None....	0.05	.0005	.0010	.0030	.0000	0.05	0.6	.040
10138	July 10,'12	None....	None.....	None....	0.05	.0005	.0010	.0100	.0000	0.05	0.9	.....
10139	July 10,'12	None....	V. slight ...	None....	0.08	.0005	.0010	.0100	.0000	0.10	3.2	.....
10349	Aug. 7,'12	None....	S. floc.....	None....	0.30	.0005	.0055	.0030	.0000	0.03	0.4	.....
10350	Aug. 7,'12	None....	V. slight	None....	0.00	.0005	.0005	.0030	.0000	0.03	0.4	.....
10352	Aug. 7,'12	None....	None.....	None....	0.00	.0005	.0005	.0030	.0000	0.03	0.4	.....
9121	July 18,'12	Slight ...	Slight	None....	0.05	V.high	.0030	.0050	.0000	110.0	12+	.....
9514	Nov. 1,'11	None....	V. slight ...	Slight ...	0.15	.0070	High	.2500	High	2.50	6.7	.....
10433	Aug. 29,'12	V. slight .	Mod. floc...	Slight ...	0.00	.0005	.0010	.0030	.0000	0.03	0.7	.....*
10434	Aug. 29,'12	Muchopal	Mod. floc...	Dist. foul	0.05	.0020	.0030	.2500	High	2.10	3.2	.....
10435	Aug. 29,'12	None....	V. slight	None....	0.05	.0005	.0015	.0030	.0000	0.03	0.1	.....
10436	Aug. 29,'12	None....	None.....	None....	0.00	.0000	.0005	.0100	.0000	0.08	1.2	.....
10437	Aug. 29,'12	Slight....	Mod. floc...	None....	0.00	.0010	.0010	.0500	.0000	0.65	1.9	.....
10438	Aug. 29,'12	V. slight .	None.....	None ...	0.00	.0005	.0005	.0030	.0000	0.03	0.7	.....
10439	Aug. 29,'12	V. sl. opal	Slight.....	None....	0.05	.0045	.0010	.0030	.0000	0.03	1.2	.... ‡
10108	July 1,'12	V. sl. opal	None.....	Sl. earthy	0.10	.0005	.0010	.0030	.0000	0.03	1.9	.....
10431	Aug. 29,'12	None....	V. slight ...	None....	0.00	.0010	.0010	.0500	.0000	0.05	1.2	.....
10432	Aug. 29,'12	None....	None.....	None....	0.00	.0005	.0005	.0030	.0000	0.05	3.2	.....
10378	Aug. 14,'12	Mod. opal	Sl. floc.....	Slight	0.05	.0005	.0010	.0030	.0000	0.05	1.9	.....‡
10137	July 10,'12	None....	None.....	None....	0.05	.0005	.0005	.0030	.0000	0.03	0.4	.100
10141	July 11,'12	None....	V. slight ...	None....	0.05	.0005	.0010	.0030	.0000	0.05	1.2	.....
10142	July 11,'12	Sl. opalesc	None.....	None....	0.05	.0005	.0010	.0050	.0000	0.03	0.6	.075
8399	Sept. 5,'10	None....	Sl. floc.....	None....	0.00	.0054	.0010	.0050	.0000	0.08	2.0	.....
8389	Aug. 31,'12	None....	Slight	None....	0.00	.0020	.0010	.0300	.0000	0.08	1.2	.....
8354	Aug. 29,'12	None....	None.....	Sl veg....	0.00	.0005	.0010	.0100	.0000	0.05	2.6	.....
8355	Aug. 29,'12	None....	V. slight ...	Slight ...	0.00	.0005	.0010	.0050	.0000	0.05	3.2	.....
8356	Aug. 29,'12	None....	Slight	None....	0.05	.0010	.0020	.0500	.0000	1.30	5.3	.....
8357	Aug. 29,'12	None....	None.....	Slight ...	0.00	V. high	.0040	.4500	.0000	4.60	8.9	.....
8358	Aug. 29,'12	None....	None.....	None....	0.05	.0010	.0020	.1500	.0000	0.65	3.2	.000
9352	Aug. 28,'11	None....	None.....	None....	0.00	.0085	.0020	1.0000	Trace	3.60	8.9	.....
10233	July 19,'12	None....	None.....	None....	0.00	.0005	.0005	.0030	.0000	0.05	1.9	.010
10158	July 12,'12	None....	V. slight	None....	0.05	.0005	.0010	.0050	.0000	0.09	1.2	0.50
10160	July 12,'12	V. slight .	V. sligt.....	None....	0.05	.0010	.0020	.2250	.0000	0.60	4.6	.....
10161	July 12,'12	None....	V. slight	None....	0.05	.0005	.0010	.0050	.0000	0.10	0.3	.040
10162	July 12,'12	None....	None.....	None....	0.05	.0010	.0010	.0050	.0000	0.11	0.4	.....
10164	July 12,'12	None....	V. slight	None....	0.05	.0005	.0010	.0050	.0000	0.06	1.2	.030
9655	Dec. 28,'11	None....	None.....	V. slight .	0.00	.0005	.0020	.0030	.0000	0.75	2.3	.....
10224	July 19,'12	None....	None.....	Slight	0.03	.0010	.0020	.2250	High	7.00	6.7	.....
10155	July 12,'12	None....	None.....	None....	0.07	.0005	.0005	.0050	.0000	0.05	1.2	.100
10156	July 12,'12	None....	None.....	None....	0.04	.0005	.0010	.0050	.0000	0.08	1.2	.....
10157	July 12,'12	None....	Mod. floc...	None....	0.05	.0005	.0010	.0050	.0000	0.05	0.4	.100
10159	July 12,'12	V. sl. opal.	V. slight ...	None....	0.05	.0005	.0010	.0050	.0000	0.05	1.9	.....
10163	July 12,'12	None....	None.....	None....	0.00	.0005	.0010	.0100	.0000	0.05	0.3	High
10330	Aug. 6,'12	None....	None.....	None....	0.00	.0005	.0010	.0050	.0000	0.05	2.0	.075
10331	Aug. 6,'12	Sl. opalesc	Slight	None....	0.05	.0010	.0010	.0600	Trace	0.08	.19	.....
10332	Aug. 6,'12	None....	V. slight	Sl. earthy	0.05	.0010	.0015	.0050	.0000	0.25	9.6	.....
10333	Aug. 6,' 12	None....	None.....	None....	0.00	.0005	.0010	.1000	.0000	0.55	1.9	.010
10334	Aug. 6,'12	None....	Slight	None....	0.00	.0005	.0010	.0050	.0000	0.03	0.9	.....
10253J	uly 23,'12	V. slight .	V. slight ...	Noue....	0.05	.0005	.0010	.0050	.0000	0.10	1.4	.....
10260	July 23,'12	V. slight .	Slight	Vegetable	0.05	.0020	.0010	.0050	.0000	0.15	3.9	.010

* Some iron.

‡ Zinc, 0.4 parts.

† Excavated reservoir.

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SUMMARY SHOWING RESULTS OF INVESTIGATION OF SUMMER RESORT WATER SUPPLIES SINCE LAST REPORT.

Town.	Total supplies examined.	Acceptable.	Non-Acceptable.	Excessive Lead.
Andover	1	1		
Auburn	8	3	5	2
Bethlehem	1	1		
Bradford	10	6	4	3
Bridgewater	3	3		
Bristol	4	3	1	
Canaan	4	2	2	
Campton	3	2	1	1
Canterbury	7	3	4	1
Carroll (Twin Mt.)	4	4		
Center Harbor	12	4	8	1
Chester	6	5	1	
Conway	1	1		
Derry	6	5	1	
Elkins	1	1		
Enfield	5	3	2	1
Fitzwilliam	5	1	4	
Franconia	2	2		
Hebron	1	1		
Hopkinton	6	4	2	1
Jaffrey	4	2	2	
Jefferson	10	10		
Littleton	2	1	1	1
Londonderry	4	2	2	
Madison	4	4		
New London	11	7	4	1
Newport	1	1		
Ossipee	5	2	3	
Plymouth	4	4		
Randolph	3	3		
Rye	2		2	
Tamworth	11	10	1	
Thornton	3	1	2	2
Tuftonborough	1		1	
Unity	1	1		
Warner	7	5	2	
Warren	5	3	2	1
Weare	1	1		
Webster	1		1	
Wentworth	5	2	3	3
Whitefield	5	4	1	1
Wilmot	2	2		
Totals	182	120	62	19
Per cents		66	34	10.4

The results indicated in the above table in the main represent different sources from those investigated during 1910, comparatively few reëxaminations having thus far been made. While we have reason to believe that material improvement has resulted following the last report, during the next season second inspections and collections will be made of those supplies which have failed to secure a satisfactory rating on the first examination.

The figures appearing in the above summary may be compared with those on supplies examined during 1910 as follows:

	1910.
Total sources examined	135
Acceptable	90, or 67%
Non-acceptable	45, or 33%
Containing 0.050 parts or more of lead	9, or 6.7%

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LEAD PIPE.

Following are statistics in connection with the use of lead pipe in summer resort water supplies, figures being given both for supplies investigated this year and during 1910, it being understood that the former represent practically no reëxaminations of those systems originally reported upon:

	1912.	1910.
Total supplies investigated using lead pipe	44	30
Percentage containing 0.050 parts or more of lead	43	30
" " 0.020 " " " " "	60	60
" " less than 0.010 parts " "	11	23

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CONCERNING CERTAIN WATER SUPPLIES.

NEWPORT.

Office of Board of Water Commissioners.

Newport, N. H., March 29, 1912.

Dr. I. A. Watson,
Sec'y of State Board of Health.

Dear Sir:—I write you in behalf of the town of Newport Board of Water and Sewer Commission of which water-works I am superintendent.

The source of Newport village water supply is Gilman Pond, a body of water of about sixty-five acres in extent, situated in the town of Unity. It is supplied largely by springs, the melting snows of springtime, of course, helping in the supply. Except during the months of April, May and June very little runs away except what is used in this village. We cannot see that our charter, approved February 13, 1895, gives to the water commissioner or to the *Newport* board of health authority to make and enforce special regulations to preserve the purity of the water, it being in another town. There is the general law forbidding bathing within one-fourth of a mile of the outlet to a pipe supplying water for domestic purposes. That may be all right where much water is flowing away continuously. Cannot the State Board of Health legally *forbid* and *prevent* bathing in Gilman Pond? We believe it should not be allowed. Neither do we think rowboats should be allowed near the gatehouse. Will you kindly give us any suggestions in the matter as the purity of the Newport water supply must be preserved. I have had some talk with Mr. Kelley of our board of health on this matter and he is of the same mind as the water commissioner.

Yours respectfully,

D. J. Mooney,
Superintendent.

Concord, N. H., March 30, 1912.

Mr. D. J. Mooney,
Superintendent, Board of Water Commissioners,
Newport, N. H.

Dear Sir:—I am in receipt of your favor of March 29, in reply, would say that the State Board of Health has authority to issue rules and regulations to protect your water supply upon petition of the board of water commissioners, of the board of health, or of ten water-takers in your town.

If you desire this board to take action, please give us full information concerning conditions now existing about the pond. Are there any summer cottages near its shores? Is it a place of general summer resort?

I am inclosing a copy of the rules and regulations issued to protect a pond in Northfield, which will give you some idea of the restrictions that may be imposed at the discretion of this board. It is not within the power of any board to prohibit fishing in a lake of the size of Gilman Pond. Bodies of water of that size are public waters,

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and navigation of the same cannot be prohibited. Sanitary regulations, however, may be promulgated which must be carried out by parties using such waters under their constitutional rights.

Very truly yours,

Inclosure.

IRVING A. WATSON,
Secretary.

NEWPORT, N. H., April 1, 1912.

Dr. Irving A. Watson,
Sec'y State Board of Health.

DEAR SIR:—Replying to your communication of March 30, will say:

Gilman Pond, the water supply for Newport village, is a natural pond surrounded by woodland, fields and pastures. It is located in the town of Unity the outlet being about 5½ miles from the center of Newport village. A highway passes it on the east side and another on the west side, both at elevations higher than the water level, but neither within sixty rods of the shore line. Two sets of farm buildings are in sight of the pond, one on each of the roads mentioned. When snow is rapidly melting some water from these buildings would reach the pond, but there is no permanent brook running near them. There is one small summer cottage, perhaps thirty rods from the pond, from which nothing would come to pollute the water. We have seen one cloth tent within three rods of the shore. Until last season I think there were but three or four rowboats used. More were placed in the pond in 1911 and greater numbers of young people, including, of course, summer boarders from the farmhouses, went there for boating and fishing. There is no hotel within several miles and it is not a place of general resort as yet. The Board of Water Commissioners by vote of the town are endeavoring to purchase land on the shore of the pond so as to prevent cattle and horses in adjacent pastures defiling the water. The sources of danger at the present time seem to be from the above-mentioned source, also from boating, bathing and ice-cutting. Notices forbidding the defilement of the water in any way, also forbidding bathing within one-fourth mile of the outlet have been kept posted but this is not sufficient. With authoritative orders from the State Board of Health conditions can be improved.

It seems that the regulations issued for the protection of the purity of the water of Chestnut Pond in the town of Northfield would be sufficient for Gilman Pond. But, in the present case, the officers in the town of Unity have no special interest in preserving the purity of this body of water. Only two families in that town have any supply from that source and the town of Newport pays but a small tax to them, since it owns no land; it owns the right of way to the pond and the right to keep the water to a certain height and to use it as needed. Who would constitute the local board of health to enforce these regulations? Can you authorize the town of Newport board of health to enforce these regulations? If so, a petition will be sent you at once signed by the board of water commissioners and the board of health of the town of Newport.

Respectfully yours,

D. J. MOONEY,
Superintendent.

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THE STATE OF NEW HAMPSHIRE.

STATE BOARD OF HEALTH.

SECRETARY'S OFFICE, STATE HOUSE.

CONCORD, N. H., April 3, 1912.

Mr. D. J. Mooney,
Superintendent, Board of Water Commissioners,
Newport, New Hampshire.

DEAR SIR:—Your favor of April 1 is received, giving quite a complete description of the source of your water supply. In reply to your inquiry, I would say that the board of health of Newport, or, for that matter, any individual might bring action against any party violating the regulations that might be promulgated by the State Board of Health to protect the purity of the waters of Gilman Pond.

The law makes it obligatory upon the local board of health (which in this case would be the board of health of Unity) to enforce the regulations; but it does not prohibit any party, I take it, from bringing action against any person who violates such regulations. The law provides that any person violating any regulation established by the State Board of Health shall be punished by a fine of twenty dollars for each offense, and I see no reason why anybody may not bring complaint against any person or party violating such regulations. . . .

Very truly yours,

IRVING A. WATSON,
Secretary.

PETITION.

To the New Hampshire State Board of Health:

Your petitioners, the board of health, and the board of water commissioners of Newport, New Hampshire, would state that Gilman's Pond, the source of a public water supply for the village of Newport, is located in the adjoining town of Unity.

They would further state that they have reason to believe that this water is in danger of contamination and that the local regulations are not sufficient or effective to prevent such pollution.

Therefore, they hereby petition the State Board of Health to investigate the case and to establish such regulations as the said board may deem necessary for the protection of said water supply against any pollution that in its judgment would endanger the public health.

Respectfully submitted,

(Signed)	J. LEAVITT CAIN,	*Town of Newport Board of Health.*
	JOHN R. KELLEY,	
	DANA J. MOONEY,	*Town of Newport Board of Water Commissioners.*
	TYLER L. BARKER,	
	FRED E. BROCKWAY,	

NEWPORT, N. H., April 19, 1912.

The foregoing correspondence and petition was laid before the board at its regular meeting, May 28, 1912, at which time the following was adopted:

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THE STATE OF NEW HAMPSHIRE.

WHEREAS, A legal petition having been presented to the State Board of Health, asking for the establishment of regulations to protect the purity of the water of Gilman Pond, from which the public water supply of the village of Newport is taken; and the matter having been carefully considered with respect to present and possible future conditions, the following regulations are promulgated under authority given the said State Board of Health in chapter 57, Laws of 1899:

REGULATIONS OF THE STATE BOARD OF HEALTH FOR THE PROTECTION OF THE PURITY OF THE WATER OF GILMAN POND IN THE TOWN OF UNITY.

1. No privy, pig-pen, stable, or other building or structure in which horses, cattle, swine, or other animals or fowls are kept, shall be built, or maintained within two hundred feet of Gilman Pond (meaning high water mark), or within two hundred feet of any inlet thereto, except in such cases as may be permitted, upon the approval of the State Board of Health.

2. No sink water, urine, or water that has been used for washing or cleansing either materials, person, or food, shall be allowed to run into said pond, or into any inlet thereof, or into any excavation or cesspool in the ground, or on the surface of any ground, within two hundred feet of said pond (meaning high water mark), or of any inlet, except by consent, and under such regulations and conditions as may be approved by the State Board of Health.

3. No dead animal, or fish, or parts thereof, or food, or any article perishable or decayable, and no dung, either human or animal, kitchen waste, swill, or garbage shall be thrown into or deposited in said pond, or left or permitted to remain within two hundred feet thereof (meaning high water mark), or into any inlet of said pond, or within two hundred feet of such inlet.

4. No person shall bathe or swim in said pond,

5. No matter, waste, or materials such as are described in sections 2 and 3, shall be thrown, deposited, or allowed to remain upon the ice of the waters of said pond, or upon that of any inlet thereof.

6. No cattle, horses, or other animal used either for teaming, riding, or speeding, shall be driven, ridden, or speeded upon the ice of said pond, except by permission of, and under such regulations as may be approved by the State Board of Health.

7. It is the duty of the local Board of Health to enforce these regulations, and for the violation of any regulation established by the State Board of Health adequate punishment is provided by law.

SUTTON.

SUTTON, N. H., May 15, 1911.

To the State Board of Health,
Concord, New Hampshire.

GENTLEMEN:—We the subscribers, who constitute the board of health of the town of Sutton, N. H., hereby represent that the water of Keyzer Pond, in the said town of Sutton, which is the source of a public water and ice supply, is being con-

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taminated, and that the local regulations are not sufficient to protect the said pond from pollution.

We, therefore, do hereby petition, under the provisions of chapter 57 of the Laws of 1899, the State Board of Health to establish such rules and regulations as may be deemed necessary to protect the said supply against any pollution that would, in the judgment of the board, be dangerous to the public health.

Respectfully submitted,

(Signed) FRANCIS E. FERRY, AVERY S. WATKINS, FRED L. HOWE. } *Board of Health of Sutton, N. H.*

A petition similar to the above was also presented asking for the establishment of regulations for the protection of the waters of Long Pond in the same town. A representative of the State Board of Health made a personal investigation into the conditions involved and rendered a report to the board. The entire situation was considered at a regular meeting of the board on August 11, 1912, when the following was adopted:

REGULATIONS OF THE STATE BOARD OF HEALTH FOR THE PROTECTION OF THE PURITY OF THE WATERS OF KEYSER POND AND LONG POND IN THE TOWN OF SUTTON.

1. No sewage of any kind, sink water, or water that has been used in washing or cleansing either materials, person or food, shall be allowed to run into Keyser Pond or Long Pond, in the town of Sutton, or into any stream tributary thereto. All excavations made for cesspools for sewage, shall be so located or constructed that their contents will not in any manner pollute the said ponds or their tributaries.

2. No privy, pig-pen, cesspool or place of deposit upon the surface of the ground for sewage, sink water, or water used for cleansing person or material shall be allowed to exist where it may be reached by high water in the event that the said ponds or their tributaries overflow their usual channels, or where rain or melting snow would be likely to wash said material into said ponds or their tributaries.

3. No dead animal, or parts thereof, or any article perishable or decayable, and no sewage, waste or garbage shall be deposited so near said ponds or their tributaries as to endanger the purity of the water.

4. None of these things, materials or conditions mentioned in the foregoing regulations, or anything else that might endanger the purity of the said water or ice supply, shall be permitted to exist in such locality or manner as, in the opinion of the board of health, would be liable to contaminate the water or ice of the said ponds or their tributaries.

5. It shall be the duty of the board of health to enforce these regulations, which shall take effect and be in force on and after October 1, 1911.

I hereby certify that the foregoing rules and regulations were adopted at a meeting of the State Board of Health held at the State House, Concord, this ninth day of August, 1911.

IRVING A. WATSON,
Secretary.

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MEREDITH VILLAGE.

A report that the water supply of Meredith village was in an unsatisfactory condition caused the State Board of Health to send its chemist, Mr. Charles D. Howard, to make a personal investigation of the matter. His report under date of July 20, 1912, was as follows:

Dr. Irving A. Watson, Secretary,
State Board of Health.

DEAR SIR:—My investigation of local conditions surrounding the Meredith village water supply system, made yesterday, showed the following facts:

For a number of weeks there have been complaints at various points on the system of disagreeable odor and taste. At times such were said to be quite bad; at others, scarcely noticeable, or wholly absent. There have also been rumors that the supply was infected with "typhoid." It may be stated at the outset that the latter have no basis in fact and must have had their origin in someone's active imagination. Yesterday I could detect neither odor nor taste; in fact, both the reservoir and a well water were served me at lunch and I found the former much the more palatable.

The reservoir is located on a hill about two miles from the village and consists of a "pocket" in an angle of two converging hillsides, the lower or third side being dammed. Of the two upper sides, one is wooded, a single farm being located on the other. In my opinion any trouble from the latter source is improbable.

The reservoir has an area of three acres; greatest depth, twenty-two feet; capacity when full, about 10,000,000 gallons; is fed partly by springs in the bottom, by two small woodland brooks and by three or four springs piped into it. No outlet except through a gate and the high water runway. Has not been cleaned in seventeen years, though each year the gate allowing waste into Lake Waukewan is said to be opened a number of times.

It will therefore be noted that the conditions are favorable (a) for the accumulation of some silt and mud; (b) for the propagation of microscopical growths; and during the above period, both have apparently been gradually increasing. Odor and taste—undoubtedly due to the last mentioned condition—were first appreciably noticeable last summer. All this time, however, and up to and including the present, this supply has given an excellent analysis, being very soft and comparatively free from organic matter and color. Two of the samples forwarded last week did afford positive results for coli by the presumptive test; but I regard this as of no special significance, under the circumstances. The two samples collected by me for this examination both resulted negatively.

I orally recommended to the commissioners that they have the brush cut back for a distance of ten feet beyond the high water line. As regards the necessity of cleaning the reservoir at this time, having in mind the present shortage of water and the fire risk involved, I advised that this does not seem strictly necessary, in view of the good chemical quality of the water and the probability that the present trouble from odors, etc., will shortly subside. Before, another season, however, the reservoir should be drained, the bottom scraped and any excess of fish removed. Present relief may perhaps be secured at certain points by flushing at the hydrants.

Respectfully,

CHARLES D. HOWARD,
Chemist.

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PROPOSED WATER SUPPLY FOR AMHERST.

Dr. Irving A. Watson, Secretary,
State Board of Health.

DEAR SIR:—An inspection made by me April 11, 1912, of a proposed source of water supply for the village of Amherst, showed the following facts:

The source contemplated is a brook emptying into the Souhegan River and which, according to the maps, bears the somewhat formidable name of Quohquinapassakessamanagnog Creek. The general course is in a southeasterly direction from the village of Mont Vernon. There are three principal tributaries, two of which would supply the reservoir directly, while a third, known as Soda Spring Brook, entering the main stream just below the proposed dam, could be made use of as an auxiliary through the construction of a by-pass into the reservoir.

The watershed at the reservoir site and for some distance above the Mont Vernon line is mainly woodland, with some pasturage. It is estimated that the construction of a ten-foot dam would afford storage for 1,000,000 gallons, or 2,000,000 for an additional height of five feet, the water at this level being under a head at the village of 120 feet. The distance to the village is two miles, the water to be conducted in a 12-inch wood-stave main. Cast iron hydrant leads, with galvanized services. The number of persons supplied would be approximately 500.

At the date of this inspection the water courses are all flowing full and the stream is draining a much more extensive area than would be the case under more normal conditions. On Soda Spring Brook there is but one farm and this is located above the normal flow. I am also informed that the normal flow of the main tributary does not extend above the culvert in the roadway which winds up into the village of Mont Vernon. This tributary seems to have its origin in a marshy spot just north of the Grand Hotel. At this time the flow through the village amounts to but little more than a mere trickle, and as stated, is said to entirely disappear, a little later in the season. This village is very sparsely settled; there are but very few flush closets and such sewage as there is, is received in an old cellar hole situated on another watershed. It is obvious that the principal chance for contamination would be from drainage from fertilized grass-fields and gardens and possibly a little sewage from one or two of the houses. It should be noted that practically all of the residences near this water course are summer homes, open during the summer only.

The Grand Hotel was also visited, but no one in charge could be found. It is claimed, however, and this seems to be borne out by what I could observe, that the sewage from this place goes into a cesspool on the northeastern side of the hill. Of course, if it should later appear that there is any possible chance of trouble from this source—which does not at present seem to be at all likely, such a condition could be easily remedied.

Samples taken of the brook water, (a) just below the proposed dam, and (b) just above the roadway leading into Mont Vernon village, afforded the following analytical results:

ANALYSES OF SAMPLES COLLECTED.

	(a)	(b)
Odor,	sl. earthy	earthy
Color,	.20	.23
Turbidity,	none	v. slight
Sediment,	v. slight	sl. flocc.

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Total residue,	3.3	5.5
Fixed residue,	1.8	4.0
Free ammonia,	0.0010	0.0015
Albuminoid ammonia,	0.0025	0.0055
Nitrates,	0.003	0.003
Chlorine (common salt, etc.),	0.22	0.40
Hardness,	0.4	0.7
Reaction for colon bacilli,	negative	positive

At my request, Mr. Wyman two days later collected two additional small samples for check colon tests, one being taken at the roadway (same as b), the other still nearer the village. Both of these afforded reaction for intestinal bacteria.

It is very possible that a careful inspection of conditions at the houses situated near the water course in question might reveal that the somewhat unfavorable data afforded by "b," as compared with "a," are directly chargeable to one or two houses only, and that by invoking the proper remedy, such condition could readily be changed. In short, in my opinion there is nothing in the present situation, so far as Mont Vernon sewage is concerned, that could not be remedied with little trouble, if necessary through enforcing the provisions of chapter 57.* During the summer and autumn months, when under normal conditions this question would be entirely eliminated, the only chance for any pollution of the lower stream would be as a result of heavy showers or long continued rains.

I may state that the analysis of the sample "a," taken just below the proposed dam, indicates water of very excellent quality. Such water would mean a very satisfactory supply, and it is the only one available to the town of Amherst, outside of the more expensive and what would appear to be in this case unnecessary, proposition of sinking wells and pumping to a standpipe.

Respectfully submitted,

C. D. Howard,
Chemist.

April 18, 1912.

THE APPLICATION OF THE HYPOCHLORITE TREATMENT TO THE LACONIA WATER SUPPLY.

While filtration through sand is the oldest and best known method of water purification, a number of other processes have been advocated from time to time. The thought of drinking water which has been treated with chemicals is apt to be repugnant to the average person, but this is largely because the nature of the process and the transformations effected are not understood.

A process which is rapidly coming into extensive use and which has proved of great value, consists in the addition to water of a minute amount of calcium hypochlorite, commonly known as bleaching-powder of "bleach." As is well known, this is an energetic disinfectant, and in addition to such bactericidal action it also destroys organic matter. When a trace of this compound is added to water, the

* Laws of 1899.

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carbonic acid naturally present in the latter reacts with it, forming carbonate of calcium (also a natural ingredient of water). The hypochlorous acid thus liberated is, in the presence of organic matter, in turn decomposed, the final products being nascent (active) oxygen and a trace of harmless lime salt. The active oxygen thus liberated serves to destroy the bacteria, together with much of the organic matter present, while it is found that both the odor and the taste of the "bleach" have completely disappeared.

The hypochlorite treatment has a great advantage over filtration in that an equipment for the former is much less expensive to install and operate, and where the water is fairly clean, is actually more efficient, bacterially, than filtration. Where there is appreciable color, turbidity and organic matter, filtration cannot, of course, be dispensed with, although even in such case there are numerous instances where it has been found advantageous to apply this treatment as an adjunct to filtration.

Where, however, the raw water supply is of good physical character but subject to such moderate or slight amount of sewage pollution as to render its use without treatment dangerous or objectionable—here the application of hypochlorite is the ideal remedy. In such cases, resort to an expensive filter-plant is now unnecessary; and a water supply which may be only periodically dangerously contaminated can be rendered entirely safe at all times, and at but small expense.

The condition above mentioned was the one by which the management of the Laconia Water Works was confronted. Though the water of Lake Paugus (an arm of Lake Winnipesaukee) is normally of excellent character, being soft, nearly colorless and with but little suspended and organic matter, it is, nevertheless, subject to a certain amount of pollution on account of the discharge of The Weirs sewage in contact with the current which flows from the larger lake through the smaller one. During the winter months the volume of sewage thus discharged is but slight, and at such time there is doubtless but little danger. The balance of the year, however, it is another matter, and though thus far no epidemic chargeable to this cause has occurred, yet because of the situation and the bacteriological findings at times on the water, it was deemed advisable to take such action as might be necessary to forestall any possible outbreak.

The hypochlorite may be introduced in a number of ways although in general the necessary equipment is simple and inexpensive; in fact, a number of state boards of health now keep on hand an equipment for

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temporary application and which may be shipped and set up for emergency use. In its rudimentary form this consists of a mixing tank and means of applying the solution at a uniform rate. For permanent installation, in order that the treatment may be carried out continuously without the necessity of expert supervision, certain auxiliary apparatus must be provided in order to render the process as nearly automatic as possible.

The following description is from a letter of Mr. Earle B. Phelps, sanitary engineer, who designed the Laconia plant:

"The disinfectant is first mixed with water in an upper tank of concrete and the strong solution thus obtained. The actual strength of this solution is determined by use of a specially calibrated chlorinometer, which has been carefully checked against chemical analyses of the same solution, so that its readings indicate to the operator the actual amount of hypochlorite in the tank. This tank is provided with a graduate gage, and reference to a table shows the operator how much of the strong solution must be measured off into the tank below to make the working solution. This working solution is maintained constantly at a strength of 300 parts of available chlorine per million parts of water. From this tank [1] and working solution, the liquid is next admitted automatically to a small orifice tank, the level of liquid in which is automatically controlled. All this apparatus for the control and measurement of this solution is made of hard rubber and glass, two materials which are not acted upon by the disinfectant.

"The purpose of this constant level orifice box is to provide against the fluctuations in pressure which would follow if the connection were made directly to the large tanks. As the level in the tank is lowering throughout the day, the pressure on the orifice becomes less and less and the rate of discharge of the chemical is decreased accordingly. With the constant level box the orifice discharges a proper quantity at all times. The orifice itself is also made of hard rubber and is capable of delivering any quantity of solution desired. By a simple twist the size of the opening may be increased or diminished, and a series of numbers on the orifice show at any minute the exact number of gallons per hour of solution that is being admitted to the water. From this orifice the solution flows directly into the suction main where it is mixed with the main supply of water and pumped thence to the reservoir. In its passage through the pump the disinfectant is thoroughly mixed with the water and tests made immediately after leaving the pump show that the bacteria which are employed as test

[1] For convenience and purposes of reserve there are two of these dosing tanks. (C. D. H.)

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organisms have been destroyed. Within a few hours the action of the hypochlorite itself has been completed upon the organic matter and the very slight almost imperceptible odor that is given to the water immediately upon treatment has disappeared.

"The cost of works of this character is exceedingly low compared with the cost of other purification works, and when considered in the light of results accomplished represents a very cheap form of insurance even where the actual necessity for such treatment may not exist at the present moment. In surface water supplies there is a constant danger of unforeseen and unpreventable contamination and epidemics of typhoid fever are frequently reported from sources that might ordinarily be regarded as above suspicion. The bacterial tests show the present character of the water but do not show the possible dangers. No test and no amount of inspection will prevent these occasional accidents and their disastrous results.

"The operating costs of this treatment as it is carried out at Laconia will be about twelve cents per million gallons of water treated. Capital charges on the plant itself are necessarily higher in a small plant, but upon a plant of one million gallons' capacity would not exceed a similar amount, so that the total cost of treatment of one million gallons a day would not exceed twenty-five cents per million, or one-quarter of one mill per thousand gallons. This sum, as I have intimated, represents a pretty cheap form of insurance against typhoid fever, even if the probability of the latter is quite remote."

As Mr. Phelps points out, each supply is apt to present its own peculiar problems and it would therefore not be safe nor proper to assume that details of one plant could be used without modification as a model for another. For this reason it would generally be desirable to secure the services of an engineer who has had special experience in making such installations.

At the Laconia plant the capacity of the mixing tank is 30 gallons while that of the two dosing tanks is 300 gallons each. The amount of bleach used is from 0.2 to 0.3 parts of available chlorine per million parts. This is equivalent to about seven pounds of chemical per million gallons of water treated. Bleaching powder is at present quoted at $1.25 per hundred pounds and to this freight must be added.

This plant has been in continuous operation since October 5 (three months). The cost of construction of the tanks, aside from that of expert supervision, is given as $200. The present daily pumpage is 350,000 gallons.

It may be argued that were The Weirs sewage removed from the

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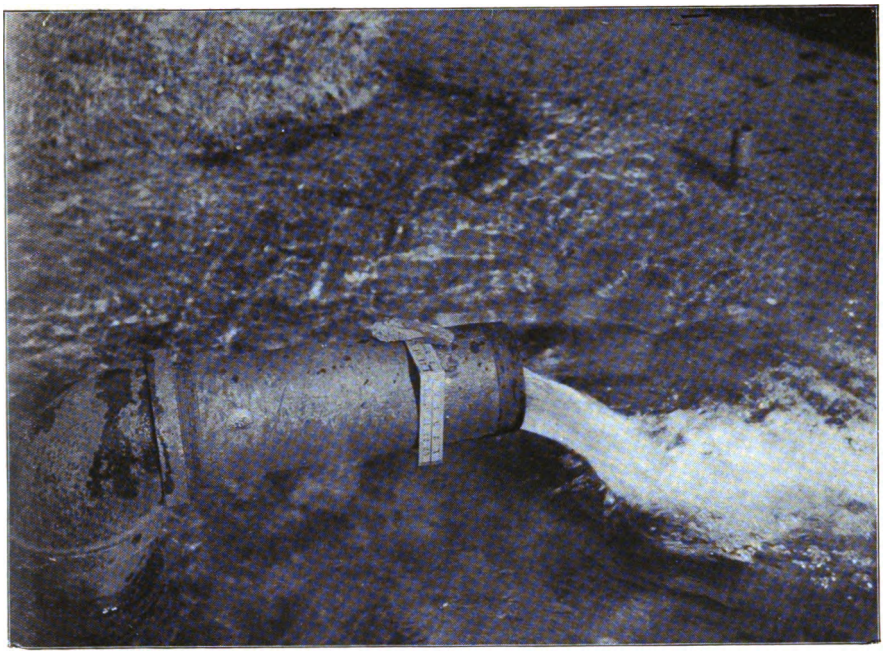
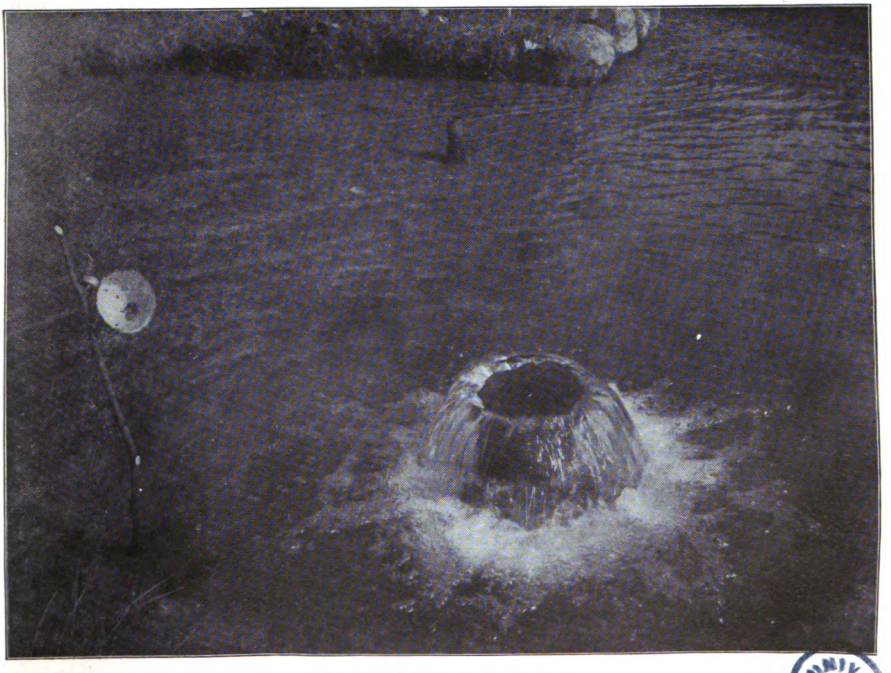


SIX-INCH FLOWING WELL.



SIX-INCH FLOWING WELL.

UNIV. OF MICH.

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lake the necessity for the treatment here described would not exist. The desirability of such removal, on esthetic grounds, even if on no other, cannot be denied. It should be understood, however, that in the event of this sewage being treated, either by filtration or by the septic tank process, the effluent from such must inevitably enter the lake; and though the degree of purification be ever so satisfactory, yet its origin cannot be overlooked, when considered in conjunction with a drinking water supply.

This fact, taken in connection with other not altogether ideal conditions on the shores of Lake Paugus, would afford justification for the hypochlorite treatment, even though the entrance above of raw sewage in quantity was excluded. Where a watershed is populated to any appreciable extent, no surface water supply can be considered absolutely safe at all times. In fact, in the older and more populous countries, artificial purification of *all* surface water supplies is required by law. With such an inexpensive precautionary means now at hand, no community can afford to take any chances as to its water supply being at all times wholly safe and above any possible suspicion.

C. D. H.

NASHUA'S WATER SUPPLY.

The supply of the Pennichuck Water Works, installed in 1853, is derived mainly from wells and springs, with an auxiliary ponds supply. Because of its unique character and the attention it has attracted among water supply engineers, it has been deemed worthy of special description and illustration in this report.

A single flowing artesian well is no novelty in certain parts of the country, though such are seldom encountered in New England. Water supplies derived from a system of driven wells, which have to be pumped, are also common enough. But it is rare, indeed, to find a series of such wells, each pouring above the surface of the ground, summer and winter alike, an unvarying stream of soft, crystal-clear water, some of which streams are larger than a man's arm.

The reservoirs and wells are located upon a very sparsely populated wooded area at some distance north of the city. The company owns or controls practically the whole watershed, as well as much land contiguous thereto, including a number of farms. In the case of the latter, the barns and stables have been removed, and a system of modern forestry, inclusive of the whole territory, has been inaugurated. While the latter will ultimately prove a source of considerable revenue to the company, its primary object is not only to conserve the

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purity of the supply but also to equalize its volume and to obviate loss through run-offs at times of high water. In addition, the whole territory, is strongly fenced, and this with an efficient system of inspection, insures at all times adequate sanitary protection.

The wells—most of which are near together—are twenty-six in number, sunken through a hard marl substratum to depths averaging eighteen to twenty-five feet, though a few run to depths ranging from thirty-six to fifty feet. The immediate territory is protected by a high wire fence and no one except employees of the company is allowed to enter this enclosure. The larger wells are, however, but a short distance from the fence and the flow may be readily observed by anyone upon obtaining permission at the pumping station below to enter the reservation.

The water, which is of unvarying temperature, practically bacteria-free, and deposits little or no sediment, is conducted in clean clay channels to the supply pond below, which has a capacity of 50,000,000 gallons. The latter is an open pond which serves as a collection and pumping basin. Here the supply is further augmented by a number of springs which may be seen bubbling up near the shores. While there is nothing that a layman could find to criticise about this supply, it is, nevertheless, at this point that the water supply expert may be inclined to reflect upon the improvement that would be involved could this body of well water be enclosed in a covered reservoir, rather than in an open, natural basin. Such an accumulation of ground water, thus exposed to sunlight, must inevitably become seeded to some extent by certain vegetative growths which, though perfectly harmless in character, are liable to give rise to slight tastes or odors at times. However, no serious difficulty of this nature has been encountered here, it being the practice to drain off and thoroughly clean the bottom sufficiently often to obviate any appreciable trouble of this character.

At the collecting basin are located three distinct pumping stations, any one of which is sufficient and ready for service, in case, through emergency, either of the other two should be out of commission. One of these is operated by water-power, the water being delivered through a main which draws from the so-called secondary supply of this company. This supply is a pond situated but a short distance back of the collecting basin and the level of which is thirty-six feet above the latter at the top of the dam. Here a fourth pumping station is located. The pond mentioned is one of a chain which extends back into a sparsely populated territory for some little distance, the whole constituting a

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WELL AND SPRING WATER FLOWING OVER WEIR.

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STORAGE POND FOR WELL AND SPRING WATER.

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total storage of a half billion gallons, in addition to the regular well water supply. While the latter is ample for all present needs, yet this pond water is available, not only for power purposes, but for regular domestic use, in case it should be at any time required. Although possessing the color and other characteristics of a surface water, yet this secondary supply compares very favorably in quality with that of the average pond supplies of the state.

Distribution is from an open reservoir located upon a hill, the capacity of which is 4,000,000 gallons. The average daily pumpage is given at 2,750,000 gallons. The total pump capacities of the four stations is 22,000,000 gallons.

C. D. H.

RELATING TO THE WATER SUPPLY OF FARMINGTON.

The Board of Health,
Farmington, N. H.

GENTLEMEN:—As requested by you I am submitting a report of my findings, with opinion and recommendations based upon my examination of your water supply June 30, 1911. A report upon the examination of sample of water taken at that time by me is also enclosed herewith.

I find that three propositions have been advanced in connection with the enlargement of the town water supply, as follows: (1) taking from the Ela River, with filtration; (2) installation of a battery of artesian wells near the present pumping station; and (3) the construction of a large dug well near the station. (2) and (3) are similar in character, probably the chief question for consideration here being that of the relative cost.

The filtration proposition, while undoubtedly capable of furnishing an unlimited supply of water of satisfactory quality, would of course entail a much increased expense over (2) or (3), not only in the cost of construction and maintenance of the filter, but in the transferring or duplication of the present pumping plant. Manifestly, if the test well now under construction will afford a sufficient supply of water (as your engineer seems to believe it will) and if the quality of this water should prove satisfactory, then this is the cheapest and probably the best solution of the problem for the present.

In this connection the main question, aside from whether the supply may be sufficient, seems to be whether or not this test well is receiving a large proportion of water by subsurface drainage from the power canal which flows about seventy-five feet to one side and at a higher level. At the time of my examination the water had been pumped out of this test well and a considerable inflow of water from near the surface and on the canal side was observed. Just how much of this may be due to leakage from the canal I have no idea. It is certain, however, that in view of the very evident springy character of the whole plot, at least a considerable proportion of the water accumulating in the well must be considered as natural ground water.

However, whether from the canal or otherwise, the analysis of the sample which I collected from the water seeping in at the side of the new well indicates water of most excellent quality, being clean, soft, free from objectionable bacteria, and in

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fact, wholly satisfactory in every way. Of course this represents but one analysis and it is conceivable that subsequent samples might not invariably indicate this quality—or as satisfactory a degree of filtration, assuming this may be partly canal water—as in the present instance. It is true that samples taken two weeks previously did not show up so well; but after examining local conditions and becoming acquainted with all the facts, I am well satisfied what this may be attributed to purely extraneous or temporary causes in connection with the construction work and collection of the samples.

All things considered, I am of the opinion that the board of water commissioners would be justified in proceeding with the completion of this well, in case they are satisfied that sufficient water will be afforded either by this or other wells sunken here in the future. This well should be put down somewhat deeper than at present and when stoned up, the upper four or five feet should be cemented. The well should be backed up with clean gravel and the ground cleared up for a radius of fifty feet or more.

The two wells now in operation on this plot afford water of satisfactory quality, though I am of the opinion that this quality could be improved by periodically cleaning and scraping the bottom of the wells, by cementing the upper four or five feet and by clearing out the small growth and in general putting the whole plot in somewhat better shape than at present. I did not see the storage reservoir, but doubtless the remark with regard to cleaning would apply here also.

The Jenney spring, so called, has always given a very unsatisfactory analysis and I was therefore much interested on my visit to note the cause of this. The latter required no seeking, being at once apparent in the large open sewer which I understand has for years flowed close by the spring house. Thus far, to be sure, the examinations of this water have indicated freedom from sewage bacteria and but little organic matter. Nevertheless, the amount of the soluble by-products present have always suggested a filtered sewage. Such water is highly objectionable for a drinking supply and I need hardly say this source should be permanently cut off.

Even for fire emergency use, there is room for question if it would not be better to have an arrangement permitting direct draught from the canal, rather than resort to this spring. Such an arrangement would give an excuse for condemning or regulating the sources of pollution which I observed on the upper part of the canal—sources which, as a precautionary measure, it would certainly be most desirable to have eliminated, anyway, but the doing of which might prove a little awkward otherwise in that the canal is not a natural water course, and you might be virtually compelled to admit that you feared a certain part of your well supply was drawn from such canal.

In conclusion, it seemes to me this well will afford you a supply of satisfactory quality. The evidence is that even if the water may be derived in appreciable amount by seepage from the canal (a matter still open to question), it is certainly being very well filtered at present. Further examinations should of course be made during the next few months. And as already suggested, because of their presence upon the general watershed and the possibility at times of leakage from the canal, arrangement should be made looking to the removal of the sources of pollution referred to.

Respectfully submitted,

C. D. HOWARD,
For the State Board of Health.

July 3, 1911.

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HUDSON WATER SUPPLY.

The water takers of the Hudson Water Works Company raised an issue by alleging that the water supplied by that company was unsatisfactory, the remedy which they sought being the introduction of the Nashua water supply, furnished by the Pennichuck Water Company, to the people of Hudson, in place of that furnished by their home company.

It appears that the issue finally reached the public service commission, in a request that authority be given the Pennichuck Water Company to cross the Merrimack River into Hudson, for the purpose of giving a water supply to the people of that town.

Pending an adjustment of the matter, the State Board of Health directed its chemist to go to Hudson and make a topographical examination of the locality; also, a like invitation was extended by the public service commission. Following is Mr. Howard's report:

THE STATE OF NEW HAMPSHIRE.

STATE BOARD OF HEALTH.

LABORATORY OF HYGIENE, STATE HOUSE.

Dr. Irving A. Watson, Secretary,
State Board of Health.

DEAR SIR:—On September 4, 1912, at your request in pursuance of an invitation of the Public Service Commission, I accompanied the members of this board on a view of the works and supply of the Hudson Water Company. This view was supplementary to an examination made September 2 by Inspector Purrington and myself on behalf of the State Board of Health, and which covered substantially the same ground. A fact which I deem of interest in connection with this controversy is not only that no inspection had ever previously been made by us of this supply but that so far as I am aware, no such inspection had ever been invited by any of the parties to the matter, or the desirability of such ever suggested to us by them.

The present supply of the Hudson Water Company is taken from two sources, (a) two wells, ten and twenty-two feet deep, respectively, located in Hudson village just below the box shop; and (b) Tarnic Pond, a small body of water possibly one-half mile in diameter and located a mile or more north of the village. The wells constitute the main supply, the pond being a reserve in cases of drouth and for fire protection. While the superintendent declares that recourse was had to the pond on but three occasions during the past summer, there is evidence that during 1911 considerable water was taken from this source.

The water is brought from the pond in an eight-inch wood pipe and on both our visits was wasting through the gate connection at the extremity of the pipe into the water basin immediately below the wells. When the pond water is used, this gate is closed. Pumpage in either case is direct into the street mains, the excess going into a steel standpipe of 50,000 gallons' capacity, which latter, it was represented, is always kept full to the top.

WELL SUPPLY.

In my opinion there is no ground for any serious criticism of the sanitary character of the well supply. The location with regard to possible chances of pollution

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is not objectionable and the water from this source has generally given a satisfactory analysis, though a sample received last week deposited some yellow sediment or coating. One condition noted, and easily remediable, is the discharge of the oily waste steam against the roof of one of the well covers. Cleaning the wells would also undoubtedly result in improvement of the present quality.

Condition of Standpipe.

Another factor tending to impair the present quality of the water as delivered to consumers from the wells—and incidentally from the standpipe—is the accumulated residuums and sediment resulting from pond water being occasionally pumped into the latter with the well water. It was represented that this standpipe had not been cleaned for five years. In short, in my opinion, any color, odor or sediment observed in the supply today is due in very large measure to a contamination of the system with pond water residues, and not to any inherent defect in the quality of the well water.

Pond Water Supply.

There are two phases in connection with a consideration of the quality and fitness for drinking purposes of the pond water, (a) sanitary conditions about the pond, (b) the character of the pond itself.

With regard to the former, these are easily remediable, in so far as the sanitary arrangements of the seven camps noted are involved. The ice-houses of the Nashua Coal & Ice Co. and of the George E. Balcom Company present a more serious difficulty in some respects. While theoretically easy, there is room for question if the problem of preventing contamination during ice-cutting and also from the men and horses during subsequent removal from the ice-houses would, under the circumstances, be solved in a satisfactory manner.

So far as adequate policing of the pond, preventing bathing, etc., is concerned, these are matters fully covered by law and present no features in any wise different or more difficult to contend with than is true in the cases of the various other surface water supplies of the state.

With regard to the entering brook flowing from Hudson Center, this also, in my opinion, involves nothing difficult of satisfactory adjustment. The claim of the company that if necessary, it can easily divert this brook entirely from the pond, seems feasible.

Finally, I am of the opinion that the only really serious problem in connection with this whole matter is as regards the character of the pond itself. The latter is but little if anything better than a large mud-hole, or sink, in the numerous shallows of which lily-pads and eel grass grow luxuriantly. Necessarily, such water is highly colored, high in decaying vegetable matter, as well as in those numerous forms of microscopic plant life responsible in large measure for odors, etc.,—conditions which our past analyses have demonstrated. This inherent condition is the true cause responsible for the complaints of the users, any contamination from the camps or from the store or piggery at Hudson Center—while admittedly under present conditions affording latent possibilities of trouble—being so remote as to have extremely little, if any, bearing upon the odors and tastes complained of.

So far as I am aware, there is now but one other supply of similar character (as regards the pond water) within the state, and the users of this have been lately taking steps for its ultimate abandonment in favor of a better one.

Respectfully submitted,

Chas. D. Howard,
Chemist.

September 7, 1912.

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FREE FLOWING SANITARY SEWAGE TANKS.

NOTABLE RESULTS AT SUGAR HILL, N. H.

By Robert Fletcher, *member of State Board of Health (as Civil Engineer), Director of Thayer School of Civil Engineering, Dartmouth College.**

The following correspondence sets forth the results of an interesting experience so clearly that each reader may draw his own conclusions:

The Homestead, Sugar Hill, N. H., August 21, 1912.

Dr. Irving A. Watson,
Secretary, State Board of Health,
Concord, N. H.

Dear Sir:

In aquiescence with your wishes for a detailed report of the building and results of the septic tanks in and around Sugar Hill during the year 1911, I respectfully submit the following:

The question of sewage on Sugar Hill, with its many large hotels and numerous summer cottages, had become of great importance. Building sites commanding the most beautiful views in the White Mountains were going begging because those wishing to build could not equip their houses with proper conveniences on account of the scarcity of room for the safe disposal of the sewage. There were also coming to the local board of health many complaints, both by the permanent residents and from summer visitors, about the stench which arose from certain localities,—where was the natural drainage from the sewers of the hotels and also from various smaller hotels and private residences in the village.

The local board of health, after looking the ground over carefully, came to the conclusion that the proposition was too large for them, and decided to notify the State Board of Health at Concord. This was done. Immediately a reply came from Dr. Irving A. Watson, secretary of the board, that he would send an inspector to investigate. This was followed by arrival of Mr. Wallace F. Purrington, state inspector, who, after looking the situation over carefully, decided to call in consultation Prof. Robert Fletcher, Civil Engineer member of the Board. Professor Fletcher, after an examination of the grounds, decided that a system of small septic tanks throughout the village would eliminate the difficulty.

Accordingly, plans and specifications were sent by Professor Fletcher to the local board of health. Under the direction of Inspector Purrington, twenty of these tanks were installed. Thus far they have been a complete success, doing their work, which is a bacteriological action, perfectly. In one instance a tank 6 feet long, 4 feet wide, with a depth of 4 feet 6 inches under the pipes, taking care of the sewage for a house accommodating fifteen people, doing its work so perfectly that the over-

* The letters given above were handed to the writer by the secretary of the State Board of Health with the request that he present the facts, with comments and illustrations of simple construction, in form to make a suitable supplement or sequel to his paper entitled "*A Brief on Ways and Means of Having Healthy Homes and Summer Resorts*," published by the Board as the *New Hampshire Sanitary Bulletin* for January, 1911.

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flow from the tank empties on top of the ground, runs beside the road for ten rods, within five rods of a church, without any odor or unpleasantness of any kind. The large tanks at the Sunset Hill House, Look Off, Pecketts on Sugar Hill, the Homestead, the Miramonte Inn, work equally as well, and put these hotels, also the village of Sugar Hill, at the top of the list in regard to sanitation.

A great feature of the installation of these tanks is that it has completely eliminated the flies. Whereas in 1911 flies were the one pest, the year 1912 goes on record without flies on Sugar Hill, a fact which can be poven by a thousand delighted summer guests.

Much credit is due to Dr. I. A. Watson, secretary of the State Board of Health, for the prompt manner in which he rendered all the assistance within his power. Much opposition was met with from the owners and agents of the various properties, and many were the letters of appeal received by the secretary of the State Board of Health, as this great change met with heavy opposition, which the State Board disposed of to the satisfaction of all parties concerned.

Many of the summer cottages are not used at all during the winter, and after the severe cold of the winter of 1911–12, the tanks began their work this spring without a break or a leak. Taking into consideration the fact that the frost goes to a depth of four, five and even six feet, it would seem that this method of sewage disposal is exactly right for localities subjected to our severe winters.

The simplicity and inexpensiveness of these tanks bring them within the reach of every man who owns a home. The average cost of a tank large enough to take care of the sewage from a house accommodating from ten to fifty people being less than $50. If one is able to do the rough work himself, it can be done much cheaper.

The dimensions of these tanks and general construction as used at Sugar Hill are as follows:

(1) It was ascertained how many persons were to be accommodated, and twenty gallons of water was allowed each person every twenty-four hours.

(2) The tanks were always made one third longer than their width, in every case allowing 4 feet 6 inches, or more, of space under the overflow pipe, which is four inches higher than the intake pipe, thus forming a trap and making the tank air-tight, which is absolutely necessary to get results from this system and which is fully explained in an article by Professor Fletcher in the biennial report of the State Board of Health, year ending August 31, 1910 (and *Bulletin* for January, 1911).

The material used at Sugar Hill for building tanks commonly used by the residents, size 8 feet long, 4 feet 6 inches wide, and 6 feet deep was:—

Sixteen bags of Portland cement.
Three cart loads of common field stone, none to be larger than six inches in diameter.
Four loads of sand.
Some 200 feet of plank, used to make the form.

The excavation for the tank should be from eight to twelve inches larger than the inside measurements of the tank, thus giving strong walls to resist the pressure of the water with which the tank is filled. This thickness also makes the tank air-proof, which, as I have already said, it must positively be. The bottom should be of not less than four inches of solid cement-mortar. The top, in many cases, was made of two thicknesses of two-inch planks, the first layer running lengthwise of the tank. This is covered with sheet iron, locked together, and then another layer of planks placed crosswise on the tank, and the whole covered with about fifteen inches of dirt.

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This has been found to make the tanks air-proof from the top. A better method, and one used by many, is a top made of cement-mortar or concrete; and this kind is recommended by Professor Fletcher, as, after it is installed, it never has to be removed.

Very truly yours,

(Signed) D. M. Tefft.

P. S. Since writing the above I have learned that Dow Academy, at Franconia, an institution accommodating about 100 students, has installed one of these tanks. This has been done on account of there being no chance for proper drainage. We are also having numerous inquiries, not only from residents in surrounding towns, but from other institutions and people residing in other states.

D. M. T.

The following is unsolicited and unexpected testimony from Prof. Irving Fisher of Yale University:—

Yale University
Department of Political Economy
Edgewood Camp, Sugar Hill, N. H., August 15, 1912.

Dr. Irving A. Watson,
Secretary, State Board of Health,
Concord, N. H.

My dear Sir:

I want to take this opportunity to express my great pleasure in the sanitary improvement at Sugar Hill this year, owing principally to the introduction of septic tanks. I have one at my own camp, and all my neighbors have them. All of us, so far as I know, even including those who thought it a hardship to introduce them, are now more than pleased with the results. The reduction in the number of flies, as compared with previous years, is very striking. I have no doubt that many lives can be saved by this method wherever it is introduced and that much sickness from typhoid fever can be prevented. In fact, it has already been remarked that there seems to be much less sickness here than previously, although there never was a great deal,—thanks to our high elevation, the winds and the sunshine.

I earnestly hope that you may find some way of introducing this improved sanitation throughout the state. There may be some objection at first, but this can easily be proven to be "penny wise and pound foolish."

Very sincerely yours,

(Signed) Irving Fisher.

FURTHER OBSERVATION OF THE PLAIN FACTS.

In order to see the situation for himself the writer visited Sugar Hill on October 25. It must be understood that the general altitude of the village is about 1900 feet above sea-level; that the majority of the residences, hotels, inns, etc., are located for a mile along two principal streets, mostly ascending to the Outlook Hotel at the southern end of the range or ridge; that there is very little level ground; that in the more compact part the houses are rather close together; and that outside of the immediate house-premises the land is generally mowing or pasture, sometimes rough and stony and partly covered by bushes. The offensive conditions alluded to above having been seen by the writer two years ago, it was a great surprise to find so great a contrast in the entire absence of anything to offend sight or smell. The ground about the

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outlets of seven tanks was examined, where the tanks varied in size from the smallest for a family, to the biggest one which has received the drainage from the Sunset House accommodating nearly 600 people, including the help. This latter tank is 28 feet long, 11 feet wide and 6 feet beneath the outlet. The effluent from it appeared to be clear and was without odor, after having come through a few rods of four-inch pipe directly upon the ground in a pasture about half a mile from the hotel. In other cases the outlets were within ten or fifteen rods of residences and occasionally nearer. Below one outlet serving both "The Homestead," where there are sometimes sixty people, and a bungalow, a small rill was running merrily through the grass, and no odor could be detected even by stooping and smelling within a foot. In this case alone some grass blades in the *clear* running water were covered with a whitish film, as of cellulose fibre; otherwise the stream might be supposed to come from a spring. In the case of an outlet disused since about a month ago the very small trench which had carried the effluent from a house accommodating twenty or more people, showed only grass partly covered by a dark brown humus which, when held close to the nose, emitted only a faint earthy odor. A sample of this soil taken home and soaked out in a saucer, discolored the water only slightly, showed only a small quantity of brown deposit among sand grains, and emitted not the slightest odor of sewage. Elsewhere a circular spot of ground below an outlet from pipe sewers of three cottages, which had been closed four or five weeks previously, showed only a powdery black-brown deposit emitting no odor. There was nowhere visible any paper or trace of sewage or any suggestion of it. The tanks are underground, *tightly covered*, with a foot or more of earth over the cover. *Rainwater* or other flow not due to house drainage is not admitted to any tank.

Thirty-four tanks had been put in at the close of the season of 1912, in the village and vicinity, and not a single case of unfavorable action seen as yet. Two years ago a spring or well near a dwelling where there had been sickness believed to be due to contamination of the water by house drainage from adjoining premises, was condemned after analysis of the water. Since the installation of sewage tanks for these dwellings, and the proper disposition of the effluent, the water of this well has been analyzed at laboratories in three states and pronounced better than that approved for many cities and towns, so that the household use of the water is resumed. In another case a tank was so situated that the effluent was allowed to trickle into the ditch along the roadside, and this is so clear and inoffensive that even sensitive city visitors do not notice it. Summer residents are here from New York, Boston, Chicago, etc.

Such results were hardly to be expected from means and methods so simple and inexpensive; for Mr. Tefft built only plain rectangular tanks with single outlet and inlet, and made no provision for taking care of the effluent. The intention was to provide gravel-filled trenches to receive the effluent underground, as described in the *Bulletin* before referred to; but, under the conditions, this was deferred to see what would happen, and with the idea that the omission can be made good any time if deemed to be necessary.

Mr. Tefft modestly disclaims credit for these good results by saying that he merely followed instructions; but he did much more than that. He realized his responsibility as a health officer; he had an intelligent appreciation of what this system of disposal had accomplished and ought to accomplish; he had the courage of his convictions, determination to do his duty, and energy to execute against strong opposition; he made a close observation of the action of the tanks, modified the details to suit local

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conditions, and so adapted scant means to the main purpose that cost was greatly reduced and the system made popular among his neighbors who at first were entirely incredulous. This statement is made in the hope that other health officers of towns may be moved to go and do likewise.

Later a visit was made to Dow Academy, Franconia. Here the conditions had been so bad as to diminish seriously the attendance at the school. The ground is level and so little above Lafayette Brook that high water in the stream would back up the sewage through the entire length of the sewer pipe, causing a disgusting overflow into the basement. Mr. Tefft prescribed a tank 12 feet long, 6 feet wide and 5 feet deep, below the outlet; and placed it *close to the building* to avoid trouble which might be caused by disturbance of the pipe by frost. This would make no nuisance beyond the tank where *only the effluent* is carried.

Inspection of these premises showed not a trace of sewage to sight or smell. The tank is buried underground within ten feet of the building; the sewer pipe, with joints cemented tight, extends about 500 feet to the edge of the "brook,"—here large enough to be termed a "creek." The ground about the outlet was only a little moist, and there was no odor or trace of sewage; and yet the building has been used for some months by over 100 pupils and teachers since the tank was built. This most impressive object lesson should convince the people of the village that there is no need of polluting Lafayette Brook by raw house drainage; those who have laid pipe sewers can make the effluent inoffensive by use of an inexpensive tank; and those more distant from the stream may by this means so far purify the sewage as to discharge it upon their own premises without offense.

DESCRIPTION OF THE FREE-FLOWING SEWAGE TANK OR UNHAMPERED CESSPOOL.

Figure 1 shows the tank in longitudinal section and the arrangement of inlet and outlet pipes. The proportions, dimensions and other details should be carefully noted. The walls and bottom are of concrete deposited between the plank forms and the face of the excavation, as shown in *Figure 2*. The planks or *thick boards* of the form should be in sections of uniform width so as to be put in successively as the wall rises; as it is better not to try to deposit concrete behind a form-section much more than two feet deep. One set of forms carefully used may serve for making several tanks.

Those who have not had experience in making and placing concrete should carefully observe the following directions:—

1. Provide a mortar board, 3 1-2 x 5 feet or larger, or use a floor of plank—or clay which will not absorb too much water.

2. Take one part of good Portland cement (say 1 bag = 100 lbs.) and two parts of *clean* sand, *free from loam* or plant matter. Spread one part of sand on the board; spread the cement upon this; then the other part of sand; then *thoroughly* mix by turning with shovels.

3. Then take three parts of *clean* gravel or broken stone with pebbles not larger than two inches either way, sprinkle this with water and mix thoroughly with the first mixture and make a heap with a crater in the middle where water may be added.

4. Turn the heap with shovels from end to end of the board, adding water, not allowing any cement to be washed away from the pile, until the mass will partly stand in a quaking heap, and, when handled, stick to the shovel, slightly.

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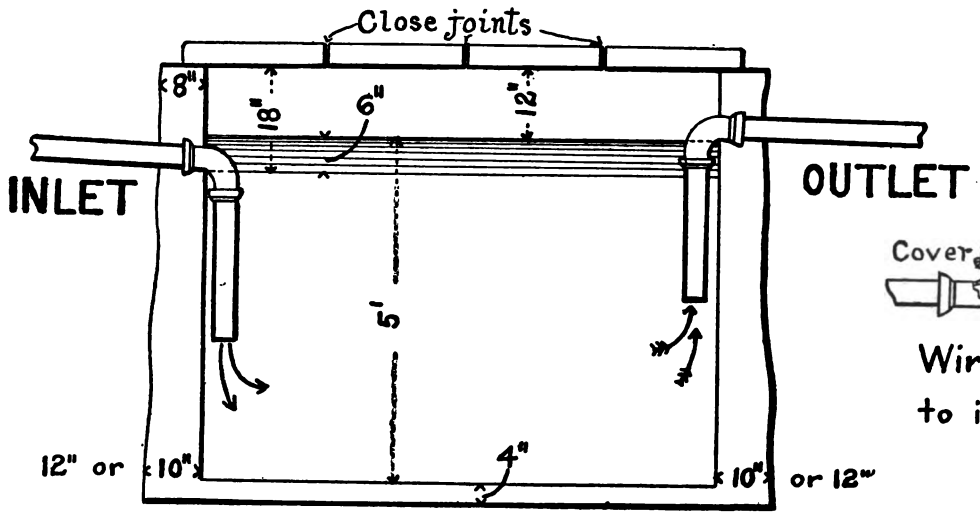

FIG. 1.

SEWAGE TANK

FIG. 4

Wire Mesh (¾" to 1") to intercept rubbish.

6½ ft. to 8 ft. long, inside.
3½ ft. to 5 ft. wide, inside.
4½ ft. to 6 ft. deep, beneath the outlet bend.

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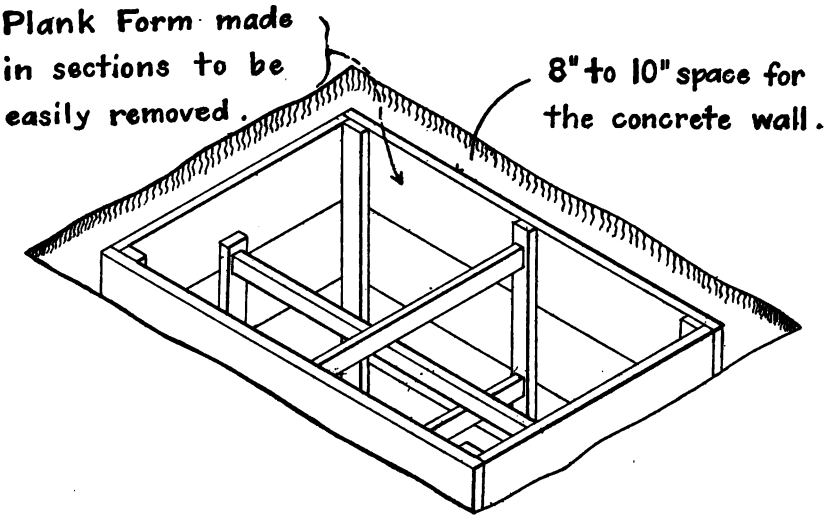
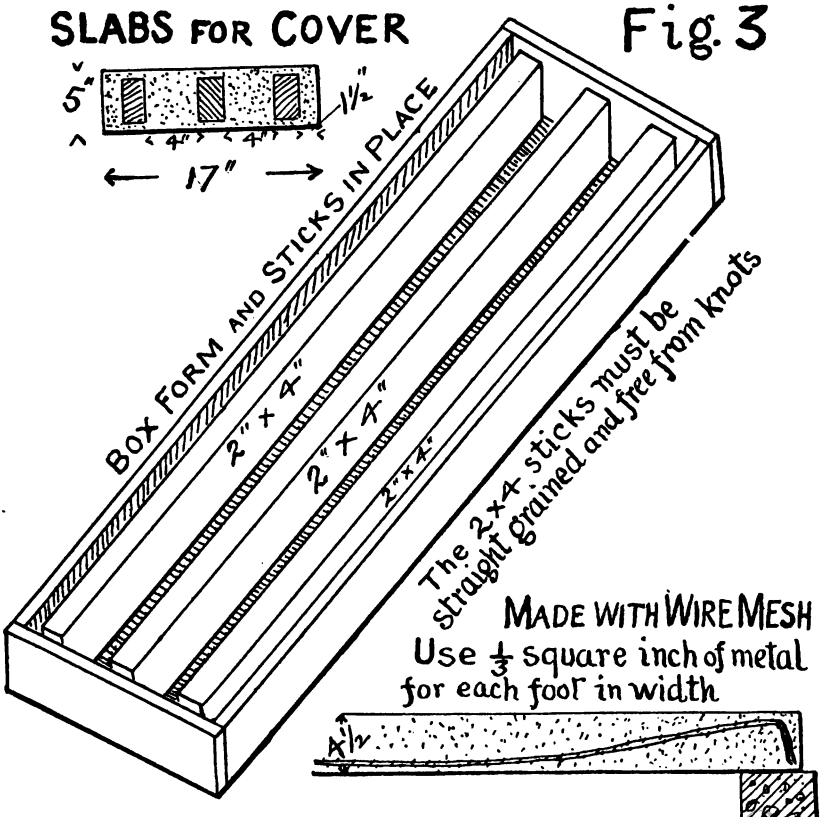


FIG. 2.— BRACED FORM FOR BUILDING THE TANK WALLS.



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5. When the concrete is mixed shovel it or dump it from old pails, first to make the four-inch layer for the floor; then, behind the form, after setting a section of the form in place, and tamp it gently with the end of a narrow board. To get a smooth and dense surface of concrete, work a spade or sod trimmer up and down between the wood and concrete as it comes in, so as to push the stones back into the mass and let the fine stuff come against the board. A surface thus gained will be smooth and need no cement wash afterwards. The board forms should be wet to start with and also the earth sides of the cut if too dry. The concrete mass must be wet enough to quake and always show wet on top. For small tanks the work should go on continuously, so as to be completed without interruption, and not allow one layer of concrete to set before another is added. As hand-mixing is hard work and a tank may require from 12 to 20 or more batches, it is better to have at least two men on the job.

6. Considerable economy of concrete may be had by providing a lot of stone (clean and damp or wet on the surface), not more than six inches thick either way, and crowding them into the concrete after it is dumped in place, making sure that each is thoroughly buried in the concrete. There should always be at least a half-inch of concrete between the stones and between each stone and the face of the wall, and no attempt should be made to have the volume of the stone more than 20 to 25 per cent. of the whole. If cement mortar alone (1 to 2 or 1 to 2 1-2 mix) is used for the walls,—when gravel is not convenient for the third ingredient,—it is essential to use the stones (or wet brickbats) to save cement. But the four-inch floor of the tank is too thin to allow such economizing there. The walls need be only six inches thick on top, but should be ten to twelve inches thick at base. As the inner face must be vertical and as the ordinary trench-face in earth, six feet or more deep, cannot be undercut very much with safety, it is usually necessary to make the wall of uniform thickness.

The sketch shows that the forms must be stiffly braced, especially if only boards are used. Two-inch plank are better and need less bracing. Wet concrete exerts strong and insistent pressure and, unless resisted, will bulge the forms enough to require considerably more concrete.

In order to hold the hanging lengths of the inlet and outlet pipes in the tank while cementing the joints they may be tightly wired to the upper side of the bends and thus supported until the cement hardens. The mixture for the joints might be one cement and one half part sand. It is usual to lay glazed pipe with the bell-end up grade, but in building-in the outlet pipe it may be better to reverse, the bell-ends for a *short distance* so that the arrangement will be as shown in *figure 1*, for the outlet.

Of course the walls may be built of brick or stone masonry, *laid water-tight*, in localities where this form of construction is preferred.

7. *The Cover.* This may be made of two-inch plank as described by Mr. Tefft in the letter given above. In any case it must be strong enough to hold a thickness of a foot or more of earth and sustain the weight on a wheel of a loaded cart, if such should happen to pass over it. As the dampness of the earth above and from the liquid below would cause the plank cover to decay in a very few years, concrete is much to be preferred.

To make a concrete cover proceed as follows:—Make a flat box-form (see *figure 3*) 5 inches deep inside, 16 to 18 inches wide (according to number of slabs needed for the length of the tank) and long enough to overlap 4 1-2 to 6 inches on the walls.

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Mix some cement mortar (1 of cement to 2 1-2 parts of *clean* mortar sand) or, if clean gravel is convenient, with all stones larger than 1-4-inch sifted out, use concrete mixed 1 part cement, 2 of sand and 2 parts of fine gravel. Place a layer of this mortar or concrete (thoroughly mixed) over the bottom of box (previously wet) one-half inch thick. On this lay three pieces of 2 inches x 4 inches studding 6 inches apart on centers, leaving two inches clear space at each end. Then fill up the box with the mortar or concrete gently tamped and trowelled at the edges so as to make smooth sides and corners. It is well to smear the inside of the box with soap or oil before putting in the concrete. Smooth the upper surface of the slab with a broad trowel. This style of slab with wooden reënforcement is Mr. Tefft's suggestion and he has made some which have worked well, especially as to stiffness. But some engineers would prefer reënforcement by heavy wire mesh, a double layer placed about 1-2 inch above the lower surface of the slab. If the slab were made four and a half inches thick it would be stronger than that reënforced by wood, but not so stiff under moderate load. The 5 inch slabs 17 inches wide would weigh about 420 lbs., if 5 ft. long; the 4 1-2 inch slab about 370 lbs. Hence one of these may be removed easily when access to the inside of the tank is desired. Each slab should have about 48 to 60 hours to set before handling it. Then it may be carefully tipped over and the form removed to be used for another slab.

PRECAUTIONS TO PREVENT STOPPAGE.

It is very important to exclude from the tank rags, solid objects and other rubbish. To this end a T (⊥) should be placed in the line of the inlet pipe where it may be accessible for cleaning out, and a piece of coarse wire mesh (3-4 inch to 1 inch), to serve as a screen, inserted through the branch of the T which will serve in future as a hand-hole. This screen may be bent or sprung into place on the lower side of the upright branch as shown in the sketch, *figure 4*. Mr. Tefft has removed from such a screen towels, rags, glass, jewelry and other articles.

It is a fundamental principle of house drainage that all pipes should have proper strainers and traps near each fixture, to prevent garbage and rags from being carried into the sewer; but as somebody will eventually tamper with such strainers or traps, and throw in or jam in rubbish into the fixtures, it is necessary to have a lower strainer and clean-out such as just described, placed in an accessible spot. The opening for the hand must be tightly closed by a cover or plug as shown. If out of doors near the tank and covered with earth, some visible marker or witness stake should mark the spot so as that access may be had to it without delay.

OBSERVATIONS AND SPECIAL CAUTIONS.

Efficiency of the Tanks. More than twenty of these constructions have served two seasons without showing any diminution in the apparent purification effected. Of course it must be understood that the purification is only partly done. Analyses of the effluent at the state laboratory showed that the light colored water carries dissolved organic matter; but, for some reason, in the quantities here distributed *over the grassland*, does not there putrify after exposure. Mr. Tefft states that the proper action and operation began soon after the tanks came into use in each case; and that the great majority of tanks which were not in use during winter when the houses were closed, resumed operation promptly in May and June when the summer season began again.

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As indicative of the temperature in these tanks, it was observed that the ground above and near them continues to be so warm that snow only remains over them a short time. The extreme winter temperature here is 25° to 30° below zero.

Exclusion of light and air. With this simple domestic sewage, tightness of the tank and its cover is essential. Mr. Tefft made this observation:—The cover was lifted from a tank which had been in operation for some months; at first bubbles of gas rose freely all over the surface; and, when fresh material was injected below at one end, lumps of partly digested matter would come to the surface here and there and appear to burst, scattering a brownish powder in the scum. But, with the cover still raised so as to keep the light and fresh air upon the scum for an hour, the action would gradually diminish and then nearly cease. Again, he found, when the space between the scum surface and cover was very much less than 12 inches, that the collected gas might cause back-pressure enough to force the seals of the house traps.

Furthermore Mr. Tefft believes that any venting of the gas-space is detrimental. For, in one case, where a 3-4-inch vent-pipe and gooseneck was inserted in the cover, the tank action seemed to be incomplete; so much so that undigested paper was brought to the outlet by the effluent. But when the vent was removed and the hole closed the effluent became like that from other tanks, apparently free from solid matter.

Excess of Water not Allowed. Again, one owner of a large tank persisted in allowing quite a stream of nearly clear water from a spring to run through; which prevented the development of the normal process of digestion. The local board of health had to intervene and insist upon compliance with proper usage.

NECESSARY CONDITIONS FOR EFFICIENCY.

From these facts and observations it appears that the successful operation of household tanks, taking domestic sewage under circumstances like those described, requires the following *essential conditions*:—

1. *The ends of the inlet and outlet pipes must be deeply submerged.* For the outlet,—using one length of 4-inch glazed pipe and a bend,—the submergence is about 2 feet, 6 inches. The inlet may well be made 6 inches deeper as shown in figure 1.

2. *The cover must be as tight as can be made with ordinary care. And no vent should be used.* Thus all fresh air will be excluded by the gas escaping from the liquid.

3. *A gas space of about 12 inches is needed between the cover and the scum on the liquid.*

4. If the conditions allow, *the tank should be entirely below the ground surface so as to have about a foot in depth of earth above the cover.* If it must be only partly below the natural surface a mound of earth should be made to cover it entirely.

5. *Rainwater, or any excessive flow of water beyond that which a household ordinarily uses, must be excluded.* Factory wastes would probably interfere with the proper operation of the tanks.

COMPARISONS. SIZE. COST.

Referring now to the design for a family tank presented in the *New Hampshire Sanitary Bulletin* for January, 1911, it appears that the Sugar Hill tanks reduce to its lowest terms this method of disposal. The siphon chamber, an adjunct there described,—however desirable for a flushing discharge of the effluent into drainage trenches,—increases the cost unduly. The gravel trenches also add more or less to the cost, depending upon convenient access to gravel banks. The greater cost of

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the work with these features retained might be so much more burdensome to the small householder in a village as to put him in a very unfriendly attitude towards needed sanitary improvements. The experience gained by Mr. Tefft's venture has shown that these features are not so necessary as was supposed, and may be omitted under the conditions he had to face. It also appears that providing a vent for the gases through the tank-covers, in the former designs, was a mistake. In short, the scheme reduces to a simple, rectangular, tight cess-pool, with free flow through it by means of deeply submerged inlet and outlet.

It will be observed that the capacity of the tanks is generally about one day's sewage, reckoned at twenty gallons per day from each of the assumed number of persons on the premises; in other words, the sewage flows through at the rate of one tankful in twenty-four hours. Judging from well-known experience in the United States and Great Britain this rate could be doubled without detriment to efficient operation, so that most of the tanks would serve twice as many people. But this is an inference, going beyond observed facts in this locality, and can only be proved by further observation of these tanks, when used at a higher rate of flow.

As to sizes the following figures may be noted (the figures denoting, in feet, respectively, length, width, depth):—

7 x 3 1-2 x 4 1-2	intended for use of a family. This was the smallest size made and would serve 30 to 40 people.
9 x 5 x 4 1-2	intended to serve 50 to 60 people.
9 x 5 x 4 2-3	" " " 60 " 70 "
9 x 7 x 4 2-3	" " " 75 or more people.
12 x 6 x 5	" " " 125 " " "
28 x 11 x 6	" " " 600 " " "

As to cost, the least expensive tank, for which the owner did most of the manual labor himself, cost about $15 cash. Even with hired help the average cost need not exceed $20 to $25. Mr. Tefft had one put in for an owner who authorized him to spend what was necessary. His bill for a tank 9 x 5 x 4 2-3 feet was $49.50, all told, for labor, accessories and superintendence. None except the large tanks for the Outlook and Sunset Houses cost over $50.

THE GENERAL SANITARY SITUATION.

Concerning the remarkable absence of flies during the season of 1912 it is fair to state that the summer was unusually cool; and that a very few were in evidence during the warm weather of the late autumn. Mr. Tefft, at the Homestead, also *takes the precaution in the spring to sprinkle all the manure in his stable and surroundings with a solution of one part of formaldehyde in eight (8) parts of water.* He thinks this kills all nits and partly developed insects, and thus cuts them off at the very beginning of the season. He is not aware, however, that any of his neighbors have adopted that practice; so that condition applies only about his own premises, and has no relation to the village generally. *The practice should be strongly recommended and made general throughout the country.*

To test for flies Mr. Tefft made this experiment:—After smearing the running board of his automobile with sweetened water he went into near-by villages, allowed the car to stand, and at once the flies collected in swarms upon it, so that parts of the surface would be black with them. But the car similarly exposed on Sugar Hill caught no

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flies. Again, as proof that flies did not tend to germinate afield under conditions made by the tank-effluent running in the grassland:—when the fields were mowed none were noticed during the last season; whereas, in former years, they would rise from the grass in swarms and cause extreme annoyance.

It would probably be a premature conclusion to assume that maintaining even the present conditions will insure immunity from flies in the future. That must depend so much upon absence of exposed garbage or any other decaying organic matter, cleanliness of stables and surroundings of the houses generally, and other well-known precautions, that the improvement of the sewage disposal is only a remedy in part.—The experience of the past season will not justify any neglect of *any* conditions about the premises which favor the increase of these dangerous pests.

Finally, it is well not to be too confident from an experience with the tanks of only two seasons. The results to date certainly are very promising for the future, but none of the tanks is yet old enough to have much of a history. The questions of accumulation of sludge,—whether much or little; of intelligent oversight and correction of irregularities, if such occur; and others which may arise, may call for future consideration and treatment.

Meantime it appears that a very important step in advance has been taken towards solving the problem of sewage disposal for dwellings and small hotels where it is essential to restrict the cost to a very low figure. *A notable success has been gained*, which apparently will have wide application.

APPENDIX TO ARTICLE ON "FREE FLOWING SEWAGE TANKS."

Samples of the effluent from two of the Sugar Hill septic tanks were sent to the laboratory of the State Board of Health and the following results obtained:

1. Odor, strong, earthy-aromatic; color, .25; turbidity, slight; sediment, moderate brown flocculent; free ammonia, .0035; albuminoid ammonia, .0200; nitrates, .0100; nitrites, .000; chlorine, .40; total solids, 8.2; fixed solids, 5.2; hardness, 4.6; colon bacilli, positive.

The following remarks were made by the chemist: "While from the nature of the process (decomposition without access of air) we should expect no great amount of nitrate, yet all chlorides and most of the mineral matter present in the original sewage should be present in the effluent. That both of these are low in this case can be explained only on the assumption that but little sink-waste was entering, or that the tank contents were diluted materially with rain water or closet flush water. Certainly, the degree of purification appears to be very satisfactory."

2. Odor, foul; color, .25; turbidity, slight; sediment, moderate brown flocculent; free ammonia, .0100; albuminoid ammonia, .0160; nitrates, .010; nitrites, .000; chlorine, .30; total solids, 5.3; fixed solids, 3.9; hardness, 2.6; colon bacilli, positive.

The following remarks were made by the chemist: "Similar to the preceding. This sample shows a distinct foul odor on standing shut up in gallon bottle. Solids and chlorides somewhat less."

While comparison with the effluent from the Imhoff tanks, such as the experimental tank at Worcester, Mass., examined recently by the writer, may not be exactly warranted, the question may be raised whether there may be equally good reason to expect odorless gases. The Imhoff tank has an open top, with pro-

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vision for a discharge of the gases through a special compartment surrounding the main sewage receptacle, so that the gases (carbon monoxide and methane,* are forced up through a continuous mass of sludge which itself is nearly odorless. It is sufficient to call attention to the work of the Imhoff tank in this connection and suggest whether operation of the Sugar Hill tanks under conditions of slight gaseous pressure on the surface, and exclusion of air and light, is in some degree analogous, and liable to produce effluents relatively inoffensive.

* No satisfactory explanation yet given for the absence of sulphuretted hydrogen.

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FOOD, DRUG AND LIQUOR INSPECTION.

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REPORT OF FOOD, DRUG AND LIQUOR INSPECTION.

Dr. Irving A. Watson,
Secretary, State Board of Health.

DEAR SIR:—I beg to submit herewith a summarized statement of the results of food and drug inspection for the biennial period ending August 31, 1912, together with comments upon certain phases of this work. Reports giving details will be found in the various bulletins issued during such period.

As indicated by the following tables, a total of 1,575 foods and drugs have been examined, representing 1,154 foods and 421 drug products. Such work has occupied but a portion of the time of this department and is exclusive of examinations of water, also of liquor inspection for the state license commission, as well as examinations of road materials for the state highway department, and further examinations of miscellaneous character made for the accommodation of the public.

TABLE SHOWING NUMBER AND VARIETIES OF FOODS EXAMINED.

	Total samples.	Not conformable.
Baking powder	16	5[1]
Butter	15	9[2]
Catsups	5	3
Coffee and coffee substitutes	15	5
Condensed milk	15	4
Cream	36	6[3]
Cream tartar	6	0
Candy	61	23[4]
Cocoa	19	7[5]
Flavoring extracts, almond	4	1
banana	3	3[6]
coffee	3	0
lemon	38	24[6]

[1] Includes four mislabeled "dry yeast"; all were above standard as regards gas content.
[2] Six genuine but of unsalable quality; one sale of renovated unmarked; one butter substitute and one light weight.
[3] Five containing less than 18 per cent. fat; one short measure.
[4] Twelve dirty, five non-permissible color, thirteen with objectionable coatings.
[5] Six misleadingly labeled; one cocoa and sugar mixture not properly labeled.
[6] Largely old stock.

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	Total samples.	Not conformable.
Flavoring extracts, orange	11	9[9]
peppermint	20	9[6]
pineapple	4	1
pistachio	3	1
raspberry	7	4[6]
strawberry	5	5[6]
vanilla	35	24[6]
wintergreen	14	7[6]
miscellaneous	10	5
Ginger ale	13	3
Honey	5	0
Ice cream	71	28
Ice cream cones	5	0
Lard	3	0
Lime juice	7	4[7]
Maple syrup and imitations	15	6
Maple sugar and imitations	12	2
Milk	399	185
Molasses	6	0
Olive oil and substitutes	24	3
Oysters	17	3[8]
Spices	29	2
Canned sardines	10	2
Pickles	5	4[9]
Bott ed soda water	35	14[10]
Soda-water syrups	60	28
Alcoholic beverages (exclusive of examinations for license commission)	11	4
Miscellaneous beverages	8	4
Vinegar	44	14[11]
Miscellaneous foods	30	5
Totals	1,154	466

[6] Largely old stock.
[7] Two diluted; two preserved with salicylic acid; all old stock.
[8] Excess of water.
[9] Two containing saccharin; two containing alum and misbranded as to quality.
[10] Contained saccharin; all non-resident vendors.
[11] Includes five mis-sales; b arrels were properly marked.

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Drug Examinations Classified.

	Total samples.	Not conformable.
Alcohol	9	5[1]
Dilute mineral acids	15	7
Camphorated oil	22	14
Calomel tablets	6	0
Calcium hypochlorite	4	3
Fowler's solution	6	1
Fluid ext. ginger	3	3
Hydrogen peroxide	40	23[2]
Lime water	7	0
Liquor potassii hydroxidi	6	1
Mercurial ointment	12	8[3]
Potassium acetate	6	0
Quinine pills	5	0
Spirits anise	23	6
Spirits camphor	17	5
Spirits nitre	34	27[2]
Spirits peppermint	18	8
Spirits wintergreen	14	5
Syrup Ferrous iodide	5	0
Syrup hydriodic acid	3	1
Tincture iodine	24	7
Tincture belladonna leaves	10	4
Zinc ointment	18	2
Powdered drugs	50	26
Miscellaneous drugs and proprietaries	63	24
Totals	421	180

[1] All up to alcoholic strength but otherwise failing to conform to the U. S. P.
[2] Initial inspection.
[3] Represents sales of dilute or "blue" ointment in place of the full strength .

Milk Inspection Summary.

Total number of samples of milk examined, 399; classed as illegal, 185. The latter number includes 62 samples found to contain added water, representing 29 sources. Seven samples were also found to represent milk that had been partially skimmed. A single instance of the use of a preservative (formaldehyde) was encountered, such sample having been forwarded from Pembroke.

The towns from which samples of watered and skimmed milk were

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received are: Amherst, Auburn, Bedford, Claremont, Greenfield, Hooksett, Littleton, Londonderry, Manchester, Pembroke, Peterborough, Portsmouth, Weare. The greater number of the watered samples were collected at the farms by the milk inspector of Manchester, acting as a special agent of the State Board of Health. In a number of cases the collections were from milk in course of shipment to the Boston market. In all cases involving willful adulteration where collection was controlled by this department complaints were filed with the county solicitors and convictions have uniformly resulted. In two cases (Rockingham County) the solicitor has failed to bring the defendants to trial, and these cases are still pending, notwithstanding that one is of date of November 8, 1911. In all other instances action has been satisfactorily prompt, although previous to the amendment to the milk law fixing a minimum penalty of $25, some of the fines imposed were extremely inadequate, considering the nature of the offense and its apparent prevalence. The smallest fine imposed in connection with milk-watering was $5, the largest $35, with two months in jail, the latter part of this sentence, however, being suspended.

A considerable proportion of the milk samples classed as illegal contained excessive amounts of dirt. Our campaign of education in this connection is, however, bearing fruit and of late there has been a very noticeable improvement in this respect, in the character of the samples received.

Reference, however, may be made in this particular connection to a tendency noted in the case of some health officers to regard cleanliness as the chief factor meriting attention and to minimize and even decry the importance of composition. In one case coming to our notice it was even intimated that the practice of milk-watering merited no special attention, the reason given being that such has no bearing upon the health of the consumer. Too much condemnation can scarcely be accorded such an ignorant and highly mistaken view. Admittedly, aside from the undoubted danger, dirty milk is repellant, and that its production should be vigorously combatted is well. It should be unnecessary to point out, however, that the producer who adds twenty-five to fifty percent of water to the milk he sells—and the practice is more prevalent than is commonly supposed—is guilty of having committed a wilful crime, not a technical one. Furthermore, not only is he practicing a serious fraud upon the consumer, but such a man will have no compunctions as to the quality of the water he uses, and the latter is as liable as not to be from some vile barnyard well.

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Finally, while it is out of place to enter upon any discussion here as to the propriety of legal standards, yet this may be stated, that it is possible, through breeding, environment and other factors, to artificially reduce the quality of milk in the interests of quantity. The value of a milk as food is gaged directly by the proportion of "solids" it contains. So long as milk continues to be sold at a fixed price, regardless of quality, we are justified in requiring that such quality shall not be allowed to depreciate below a certain minimum limit.

Nature of Illegality Found.

It should be understood that in the case of foods other than milk, the above figures expressive of the number of samples found to be illegal must not be accepted as in any wise representative of actual conditions. In the first place, it needs to be borne in mind that collections are made in general only of unknown or suspected brands. The great bulk of the articles carried in any store, known from past inspections or experience to be above suspicion, are passed over by the inspector.

In the second place, it should not be inferred that because an article is listed in the illegal column, such is grossly adulterated, or contains ingredients injurious to health. Under the misbranding clause of the general food and drugs law it is frequently necessary, because of some false or misleading statement or claim appearing upon the label, to class as illegal many articles that are in themselves of satisfactory character or free from foreign admixture. In fact, it is probably true that in the majority of cases where packaged articles have been condemned, misrepresentation as to quality was responsible. Another form of misrepresentation aside from that of quality is in connection with statement of weight or measure. If the claims in this respect are untrue, then the article is classed as illegal.

Finally, notwithstanding that the food and drugs law has now been in force for over five years, yet now and then we find a dealer who has persisted in retaining upon his shelves goods of more or less ancient origin. Until recently we have been disposed to be duly lenient in such cases. It is obvious, however, that the time has now passed when a plea of "old stock" can be properly accepted in extenuation. As a class, the dealers of one city have been conspicuously careless in this respect, some of the stores having been found to contain stock ridiculously old. Accordingly, complaints were issued against a half-dozen such dealers but in view of the representations and promises received, it was decided not to press the charges at this time. In three cases of similar character, brought against Manchester grocers, the

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hearing on which was had without any notification being accorded this department, the court dismissed the defendants without imposing sentence, following pleas of *nolo*.

Prosecutions.

During the period, 54 complaints, involving 43 persons or firms, have been filed with the prosecuting officers. This is inclusive of five cases brought under the sanitary food law enacted during the last legislative session. As you are aware, prosecutive action under the latter law has been held somewhat in abeyance pending a decision by the Supreme Court as to the powers of the board in this connection. Of the other cases, 12 were brought under the dairy law, three under the cider vinegar law, five under the ice cream law, the balance being under the general food and drugs law.

As was intimated in a preceding paragraph, both this department and the courts have shown great leniency in connection with actions for violation of the law. Where the circumstances seem to justify it, it is our practice to let the matter go with a warning notice and publication in the *Bulletin*. Where this does not seem calculated to afford an adequate remedy for conditions, or the circumstance does not merit such mild treatment, prosecution is resorted to. The fine ($10) is merely a nominal one, as compared with penalties elsewhere for like offences; such, however, is believed to be adequate to accomplish the purpose of the law under conditions obtaining in this state and it has the advantage of permitting of the termination of cases in a justice's court. Nevertheless, in a few instances, such as where the costs were considerable or there were mitigating circumstances, we have been satisfied to recommend that the fine be suspended.

Unfortunately, however, as will be observed from the following tables, the courts have as a rule been inclined, either to regard violations of this character as not very serious, or to accord what we regard as undue weight to the defendant's plea of ignorance, the result being a tendency to remission of fines. In most cases, there is no proper justification for such action. The dealer has the advantage of the information contained in the *Bulletin*, if he is minded to use it; further, he can avail himself of the protection in a jobber's guaranty; finally, it is his business to familiarize himself with the requirements of the law and to recognize his responsibility thereunder as regards the character of the goods he sells. Too many dealers are disinclined to burden themselves in any such manner. Though price and experience should be sufficient to invoke suspicion as to the legality

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of many an article, yet we encounter merchants every now and then who give this phase of their business little or no thought, apparently assuming that pending definite notification to the contrary by the inspection department, they are justified in stocking almost anything on which a profit can be made. While the warning notice system is doubtless in part responsible for this attitude, yet until our courts see fit to rate the responsibility of the dealer at nearer its true value, the best progress cannot be hoped for.

For the benefit of those disposed to believe that the provision of the general food and drug law[1] which gives this department the benefit of the fines accruing from prosecutions brought thereunder is improper, in that it may lead to persecution of vendors, it may be stated that the total amount of such fines assessed and *collected* from defendants during the period is twenty dollars.[2]

[1] Under all the special food laws, the fine goes to the city or county.
[2] At this date no correct return of this amount has been made to the state treasurer.

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LIST OF PROSECUTIONS INSTITUTED BY THE STATE BOARD OF HEALTH IN CONNECTION WITH VIOLATIONS OF THE FOOD AND DRUGS LAW, FOR THE BIENNIAL PERIOD ENDING AUGUST 31, 1912.

Name.	Place.	Complaint.	Complaint filed.	Result.
Roland M. Morrison..	E. Weare	Watered milk.....	Sept. 8, 1910	Fined $10, with costs.
R. E. Emery.....	Greenfield.....	Watered milk.....	Sept. 9, 1910	Fined $10, with costs.
W. R. Russell.....	Greenfield.....	Watered milk.....	Sept. 9, 1910	Fined $10, with costs.
Calixta Brodeur	Nashua.....	Oysters containing excess of water	Dec. 14, 1910	Fined $10, with costs; appealed.
Sterling Extract Company.	Cambridge....	Misbranded and adulterated lemon extract.	June 2, 1911	Fined $10, with costs; fine suspended.
Importers' Tea & Coffee Co.	Manchester ...	Misbranded and adulterated orange extract.	June 2, 1911	Fined $10, with costs: fine suspended.
Importers' Tea & Coffee Co.	Manchester ...	Misbranded and adulterated vanilla extract.	June 2, 1911	Case continued for sentence.
Importers' Tea & Coffee Co.	Manchester ...	Misbranded and adulterated peppermint extract.	June 2, 1911	Case continued for sentence.
G. H. Richmond.....	Claremont	Watered milk.....	Jan. 10, 1911	Fined $5, with costs.
A. D. Lemay.....	Manchester ...	Adulterated cider vinegar.....	June 2, 1911	Fined $10, with costs; fine suspended.
C. H. Sawyer.....	Manchester ...	Adulterated cider vinegar.....	June 2, 1911	Fined $10, with costs; fine suspended.
Berquist & Anderson .	Manchester ...	Adulterated cider vinegar.....	June 2, 1911	Fined $10, with costs; fine suspended.
Herman Smith.....	Manchester ...	Saccharin in soda-water.....	June 2, 1911	Fined $10, with costs, fine suspended.
Herman Smith.....	Manchester ...	Saccharin in soda-water.....	June 2, 1911	Case continued for sentence.
Herman Smith.....	Manchester ...	Saccharin in soda-water.....	June 2, 1911	Case continued for sentence.
A. Chicless.....	Concord.....	Unmarked renovated butter	Dec. 12, 1911	Fined $10, with costs; fine suspended.
Dona Breault.....	Hooksett.....	Watered milk.....	Nov. 3, 1911	Fined $25, with costs.
Fred W. Fraser.....	Hooksett.....	Watered milk.....	Nov. 25, 1911	Fined $35, with costs and 2 months in jail; jail sentence suspended.
Henry Rivers.....	Auburn.....	Watered milk.....	Nov. 8, 1911	No action by solicitor.*
C. A. Rogers.....	Amherst.....	Watered milk.....	Feb. 3, 1911	Fined $25, with costs.
C. A. Rogers.....	Amherst.....	Dirty milk.....	Feb. 3, 1912	Case continued for sentence.
Dillon Bros.....	Dover.....	Misbranded and adulterated extract peppermint.	Feb. 12, 1912	Fined $10, with costs; fine suspended.
Dillon Bros.....	Dover.....	Misbranded and adulterated extract ginger.	Feb. 12, 1912	Fined $10, with costs: fine suspended.
W. E. Stevens.....	Dover.....	Lime-juice adulterated with salicylic acid.	Feb. 12, 1912	Fined $10, with costs; fine suspended.
A. H. Richards.....	Manchester ...	Wormy candy.....	Feb. 10, 1912	Case continued for sentence.
A. S. LaSalle.....	Manchester ...	Misbranded and adulterated extract lemon.	Feb. 10, 1912	Case continued for sentence.
M. Verette.....	Manchester ...	Misbranded and adulterated extract orange.	Feb. 10, 1912	Case continued for sentence.
M. Verette.....	Manchester ...	Misbranded and adulterated extract orange.	Feb. 10, 1912	Case continued for sentence.
E. H. Blaisdell.....	Portsmouth ...	Misbranded and adulterated extract lemon.	Feb. 13, 1912	Not brought to trial.
E. H. Blaisdell.....	Portsmouth ...	Misbranded and adulterated extract lemon.	Feb. 13, 1912	Not brought to trial.
E. H. Blaisdell.....	Portsmouth ...	Misbranded and adulterated extract orange.	Feb. 13, 1912	Not brought to trial.
Sanborn & Co.....	Portsmouth ...	Misbranded and adulterated extract lemon.	Feb. 13, 1912	Not brought to trial.
Geo. H. Joy.....	Portsmouth ...	Misbranded and adulterated extract wintergreen.	Feb. 13, 1912	Fined $10, with costs, fine suspended.
A. E. Rand.....	Portsmouth ...	Misbranded and adulterated extract vanilla.	Feb. 13, 1912	Not brought to trial.
C. D. Lear.....	Portsmouth ...	Adulterated lime-juice.....	Feb. 13, 1912	Not brought to trial.
C. P. Carroll.....	Portsmouth ...	Adulterated lime-juice.....	Feb. 13, 1912	Not brought to trial.

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LIST OF PROSECUTIONS INSTITUTED BY THE STATE BOARD OF HEALTH—*Continued.*

Name.	Place.	Complaint.	Complaint filed.	Result.
Louis Tremblay	Concord	Unmarked renovated butter	Dec. 12, 1911	Fined $10, with costs; fine suspended.
J. A. Labrecque	Manchester	Watered milk	Apr. 4, 1912	Fined $25, with costs.
Daniel Linehan	Londonderry	Watered milk	June 20, 1912	No action by solicitor.*
Arthur Gatinas	Manchester	Ice-cream dirty and below standard.	June 4, 1912	No trial; warning by police department.
George George	Manchester	Ice-cream below standard	June 4, 1912	No trial; warning by police department.
Jos. Eluto	Manchester	Ice-cream below standard	June 4, 1912	No trial; warning by police department.
Oscar Bulis	Manchester	Ice cream below standard	June 4, 1912	No trial; warning by police department.
Ovila Ripeau	Suncook	Milk adulterated with formaldehyde.	July 22, 1912	Fined $25, with costs.
Philip Vintcum	Rockingham Fair.	Ice-cream below standard	Aug. 22, 1912	Fined $10, with costs.
Wm. Orris	Rockingham Fair.	Adulterated cider	Aug. 23, 1912	Fined $10, with costs.
C. C. Cifree	Rockingham Fair.	Saccharin in soda-water	Aug. 23, 1912	Fined $10, with costs.
C. C. Clfree	Rockingham Fair.	Saccharin in ginger-ale	Aug. 23, 1912	Fined $10, with costs; fine suspended.
C. C. Cifree	Rockingham Fair.	Unlabeled imitation soda-water	Aug. 23, 1912	Continued for sentence, (second count).

PROSECUTIONS INSTITUTED FOR VIOLATION OF THE SANITARY FOOD LAW.

E. H. Lavigne	Nashua	Bread unwrapped	July 7, 1911	Acquitted.
Daniel Boisvert	Concord	Bread unwrapped	Aug. 28, 1911	Fined $10, with costs; fine suspended.
Normand Bros.	Manchester	Bread unwrapped	Aug. 16, 1911	Fined $10, with costs; appealed; case awaiting decision by Supreme Court.
Boston Fruit Co.	Dover	Fruit exposed	May 8, 1912	Fined $10, with costs.
A. Beaudry	Claremont	Pastry exposed	June 28, 1912	Acquitted.

* Rockingham County.

Present Extent of Food Adulteration

Notwithstanding the information extended through bulletins and addresses, it is apparent that the public is notably ignorant as regards the character and extent of food sophistication. On the one hand, we have that small but optimistic class who "take little stock" in the subject, believing that as their fathers and grandfathers managed to survive and prosper, so they themselves need not give the matter concern. On the other hand, there is that much larger class who are apt to imagine that nearly everything is "poisoned," or debased or otherwise not what it should be.

Unfortunately, the latter view has been fostered to an unwarrantable extent, partly by certain journalists and professional agitators, interested only in creating "news" or thrills and caring little or nothing

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for the actual truth; partly through the efforts of well-meaning though misinformed or ignorant crusaders; partly—and this in no small measure—by those whose endeavor and peculiar interest it is to create in the public mind, especially the female public, a suspicion of brands in general in order to stimulate the patronage of brands in particular.[1]

Examples of the first class of influence are of daily occurrence; some of the statements one finds in press or magazine are essentially true, while it is patent that others represent a combination of the most ridiculous distortion or misinterpretation of the facts with downright falsehood.[2] As exemplifying the second class, reference may be made to the statements appearing in a comparatively recent book of a well-known writer upon medical topics, involving such astounding assertions as that 75 per cent. of canned goods are preserved with salicylic acid, also that 70 per cent. of infantile disorders are chargeable to the use of preservatives in milk! The salient point in this connection is that, as this writer's sincerity can scarcely be questioned, if a physician of such broad education and experience can be so far deceived, it is small wonder that the average person is willing to credit almost anything he may read or hear in this respect.

Therefore, while it is true that, on the one hand, there are still many abuses requiring eradication, on the other, but little attention need be given to the pessimistic claim occasionally advanced that the operation of our food laws has proven a failure and that such serve but to permit of "legalized food poisoning." This latter claim is based upon the fact that under the provisions of the present law, not only the genuine article but any compound or imitation of such article may be sold, the only provisos being that such shall contain no ingredient deleterious to health, that it shall not be "colored, coated, powdered or stained" in such manner that inferiority is concealed,

[1] A number of years ago, in connection with some food legislation in another state, in which the writer was interested, an offer was made to "circulate" a large sum of money, provided a clause forbidding the use of alum should be inserted. While there is no question that the consumption of foods containing unchanged alum is liable to cause impairment of health, still, in the interests of the truth it should be stated that we have as yet no definite unbiased scientific assurance that this is true in the case of a carefully made alum baking powder. And until this is demonstrated, too much attention should not be given to the claims industriously circulated by those interested in promoting the sale of a much more expensive product.

[2] As illustrative of a certain type of newspaper enterprise involving exploitation of the public's ignorance and credulity concerning such matters, witness the following headline: DEATH-DEALING CANDY, LOADED WITH POISON. This "exposé," in alleging that candy contains "floor-varnish, radiator-paint, furniture-glue, wall-sizing, tallow, wood-alcohol, sulphites, and iron rust" (!) cites a number of cases of illness and death due (by inference) to eating poisonous candy. Though admitting that one of these children died of appendicitis, nevertheless the writer raises the question if some "candies served at a party" may not have been responsible for this ailment. As usual, the statements made represent the grossest and most reckless sort of exaggerations, there being nothing in the quality of candy at present to warrant alarm, admitting there is room for improvement in some cases.

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and that the label shall bear no statement that is false or misleading in any particular.

Admittedly there are upon the market numerous such mixtures and imitations, for the most part, however, composed of entirely wholesome materials and in many cases representing very satisfactory as well as economical substitutes for the more costly genuine article. The problem is, not so much to prevent altogether the sale of these mixtures—as some of the more radical views involve, but which would probably prove impossible under any law that was constitutional—as to make it certain that such articles shall be sold for exactly what they are and at a price commensurate with their true value. It is well known that in connection with the production or manufacture of food stuffs there results a great deal of waste. The latter includes (1) those inferior though edible and wholesome grades that are not successfully marketable without "processing" or "blending" in some manner; (2) certain wholesome and edible by-products of manufacture. Not to utilize these would involve a grievous extravagance—an economic sin.

In order to cause the sale of such products for what they are and to prevent their being represented as the genuine or of greater value than they actually are, it is necessary to restrict the use of artificial color and to rigorously enforce what are necessarily somewhat elaborate rules in connection with the provision forbidding misbranding. Hitherto it has been the universal custom to assume that a statement upon the label is legally extenuative of the addition of imitation color. While so far as is known this assumption has never been controverted, still there would seem to be good ground for the opinion that such an article is, nevertheless, to be regarded as adulterated and therefore illegal, notwithstanding a declaration of added color.

As regards these imitations and mixtures, it may be said in their favor that at the present time such are very generally truthfully labeled and the purchaser of these who will take the pains to read the label, need not be deceived in any great measure as to their true character. Not only are the majority of packers now showing a reasonable degree of conscientiousness as regards truthful labeling but food products in general are cleaner, of better quality, more carefully packed and much freer from chemical preservatives, artificial color and other sophistications which, until but recently, were considered necessary or ligitimate.

As an example of very recent progress effected in this state, the matter of that class of beverages known as "soft drinks" may be cited. As is well known, the manufacture and sale of such constitutes

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a rapidly growing and extending industry. Formerly these beverages commonly contained the drug saccharin as an auxiliary sweetening and preserving agent. For some time the manufacture and sale of saccharin-sweetened goods in this state has been entirely abandoned, the only recent instances of this use being in connection with sales at fairs by individuals from outside the state.

Hitherto it has been the practice of bottlers to substitute capsicum in large measure for ginger in ginger ale. Though this practice still obtains elsewhere in greater or less degree, here in New Hampshire our bottlers have largely abandoned capsicum and are manufacturing their ginger ale from ginger. Further, the recent movement by this department against the use of soapbark in beverages was, so far as we are aware, the first to be made by any state. Soapbark is a poisonous as well as an unnecessary addition, and it is believed that such will eventually become one of the practices of the past.

Drugs.

The tabulated summary affords a fair indication of the conditions obtaining in connection with the sale of drugs and medicines. It is our experience that while the average druggist is a reasonably careful man and will not, as a rule, knowingly dispense drugs that are of inferior or substandard character, still the practice of checking up the stocks now and then has had a very salutary effect in improving the general standard of quality, as well as in stimulating a greater degree of care and attention in the case of those pharmaceuticals liable to deterioration. Recent investigations in the latter connection have included hydrogen peroxide and spirits of nitrous ether. Though the results were as good as might be expected on an initial inspection, considering the character of these drugs, it is believed that a second inspection will reveal a much better condition.

On other articles, the deficiencies existing in connection with those classed as illegal were, for the most part well under 25 per cent.—generally much less than this.

It is, however, in the field of proprietary medicines and "medicinal" foods that we continue to encounter what are perhaps the most reprehensible products coming within the purview of the law. The deception is generally in the claims for curative virtues. Reform in this connection—at best an up-hill matter—received a serious check sometime ago in a Federal Supreme Court decision to the effect that the misbranding provision of the law has no force in this connection. The recent Sherley amendment to the federal act, designed to remedy this deficiency ,is regarded in some quarters as of doubtful utility.

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Examinations for State License Commission.

During the biennial period ending August 31, 1912, twenty-eight samples of liquors were submitted for examination by agents of the state license commission. This represents a material decrease over the number submitted in past years, presumably largely due to the present chaos involved in definitions and labeling.

At present there are two distinct laws governing the quality and branding of liquor. The earlier one (chapter 95, Laws of 1903) contains a section which provides that "It shall not be lawful to sell or expose for sale, or to have on the premises where liquor is sold, any liquor which is adulterated with any deleterious drug, substance or liquid which is poisonous or injurious to the health."

It will be noted that the above is applicable only to those cases where a "poisonous or injurious" adulterant is present. In practice, this provision is of but very slight application in the present state of the trade, and as a measure designed to regulate the general quality and branding of liquors it is of but small value. The same law does, however, include in an incidental way a provision against liquor being "other than what it purports to be." While this seemingly insignificant phrase is very sweeping in its application, it is entirely too meager to afford any good working basis. For its proper application, well-defined and established definitions and standards are essential. And at present in this respect there is no unanimity of opinion.

As the law mentioned is the one establishing the State License Commission and defining its duties (among which are included inspection of the quality of liquors) it is the only law which this body has recognized for its guidance in this connection. On the other hand, the general food and drugs law of 1907, under which the State Board of Health operates, and which is "an act for preventing the manufacture or sale of adulterated or misbranded, or poisonous, or deleterious foods, drugs, medicines, and liquors," embodies much more specific provisions effecting the adulteration or misbranding of liquors. The federal law, as well as that of a majority of the states, has identical provisions in this respect, and obviously what is needed are uniform definitions and standards, a complicated and more or less technical matter which the framers of these laws in no instance ventured to undertake.

Settled at one time, the matter was reopened during the present presidential administration, with the result that the former rulings were reversed and radically changed. Following is the text of Food

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Inspection Decision No. 113, which is the present official guide for action under the federal law:

FOOD INSPECTION DECISION NO. 113.

THE LABELING OF WHISKY, MIXTURES, AND IMITATIONS THEREOF, UNDER THE FOOD AND DRUGS ACT OF JUNE 30, 1906.

Under the Food and Drugs Act of June 30, 1906, *all unmixed distilled spirits from grain*,[1] colored and flavored with harmless color and flavor, in the customary ways, either by the charred barrel process, or by the addition of caramel and harmless flavor, if of potable strength and not less than 80° proof, are entitled to the name whisky without qualification. If the proof be less than 80°, *i. e.*, if more water be added, the actual proof must be stated upon the label and this requirement applies as well to blends and compounds of whisky.

Whiskies of the same or different kinds, *i. e.*, straight whisky, rectified whisky, redistilled whisky and neutral spirits whisky are like substances and mixtures of such whiskies, with or without harmless color or flavor used for purposes of coloring and flavoring only, are blends under the law and must be so labeled. In labeling blends the Act requires two things to be stated upon the label to bring the blended product within the exception provided by the statute: First, the blend must be labeled, branded or tagged so as to plainly indicate that it is a blend, in other words that it is composed of two or more like substances, which in the case of whisky must each be of itself a whisky, and Second, the word "blend" must be plainly stated upon the package in which the mixture is offered for sale. A mixture of whiskies therefore, with or without harmless coloring or flavoring, used for coloring and flavoring only, is correctly labeled "Kerwan Whisky. A Blend of Whiskies."

Since the term whisky is restricted to distillates from grain, and distillates from other sources are unlike substances to distillates from grain, such distillates from other sources without admixture with grain distillates are misbranded if labeled whisky without qualification, or as a blend of whiskies. However, mixtures of whisky, with a potable alcoholic distillate from sources other than grain, such as cane, fruit or vegetables, are not misbranded if labeled compound whisky, provided the following requirements of the law are complied with: First, that the product shall be labeled, branded or tagged so as to plainly indicate that it is a compound, *i. e.*, not a mixture of like substances, in this case whiskies; and, Second, that the word "Compound" is plainly stated upon the package in which the mixture is offered for sale. For example, a mixture of whisky, in quantity sufficient to dominate the character of the mixture, with a potable alcoholic distillate from sources other than grain and including harmless color and flavor is correctly labeled "Kerwan Whisky. A compound of whisky and cane distillate." Unmixed potable alcoholic distillates from sources other than grain, with or without harmless color or flavor, are not misbranded if labeled "Imitation Whisky."

When an essence or oil is added to a distillate of grain, which without such addition is entitled to the name whisky, and the effect of such addition is to produce a product which simulates a whisky of another kind different from the kind of whisky to which the essence is added, the mixture is an imitation of the particular kind of whisky which is simulated, *e. g.*, if rye essence be added to a highly rectified distillate of corn, the mixture is misbranded if labeled rye whisky. Such a mixture is not misbranded if labeled "Whisky—Imitation Rye."

[1] That is, inclusive of alcohol. (C. D. H.)

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Nothing in the Food and Drugs Act inhibits any truthful statement upon the label of any product subject to its terms, such as the particular kind or kinds of whisky, vended as whisky or as blends or compounds thereof, but when descriptive matter, qualifying the name whicky, is placed upon the label, it must be strictly true, and not misleading in any particular. The law makes no allowance for seller's praise upon the label, if false or misleading, and the product is misbranded if a false or misleading statement be made upon one part of the label and the truth about the product be stated upon another part. Similarly a product is misbranded if the label is false or misleading through the use of a trade-marked statement, design or device. The fact that a phrase, design or device is registered in the U. S. Patent Office gives no license for its deceptive use. All descriptive matter qualifying or particularizing the kind of whisky, whether volunteered or required by the law to be stated, as in the case of blends and compounds, must be given due prominence as compared with the size of type and the background in which the name whisky appears, so that the label as a whole shall not be misleading in any particular.

Food Inspection Decisions 45, 65, 95 and 98, and all rulings in conflict herewith, are hereby revoked.

FRANKLIN MACVEAGH,
Secretary of the Treasury.
JAMES WILSON,
Secretary of Agriculture.
CHARLES NAGEL,
Secretary of Commerce & Labor.

WASHINGTON, D. C., February 16, 1910.

As the above decision has been adopted by but very few of the state inspection departments, and as its terms are generally repugnant to food control chemists, as well as to an important faction in the trade, it has been predicted that an appeal from its provisions will eventually be taken.

Meanwhile, for the general guidance of the trade, the state license commission has recently issued a circular, from which the following is quoted:

In our opinion a practical administration of the law requires that whiskey, brandy, rum and gin should contain not less than 40 per cent. of alcohol by volume (80 degrees proof) and that alcohol should contain not less than 94.9 per cent. of ethyl alcohol (189.8 degrees proof).

We expect all licensed dealers to strictly conform to these standards and to see that any liquor kept by them is not different from what it purports to be, and is not adulterated with any deleterious drug, substance or liquid which is poisonous or injurious to the health. If you have any doubt about the *standard* or *quality* of any liquor kept by you, or about the same being *misbranded* or *improperly labeled*, it will be well for you to have it analyzed at once. An instance of *misbranding* or *improper labeling* would be when the package or bottle containing the liquor is marked as follows: "Pure Old Kentucky Wiskey," and when the liquor by analysis is found to contain less than 40 per cent. of alcohol and but little or no old whiskey. Another instance would be when the package or bottle is marked as follows: "Best Whiskey Made," and when the liquor is of an inferior quality. It may contain 40 per cent.

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of alcohol by volume and still not be what the label indicates. The label should not contain any statement, design or device which is false or misleading in any particular.

Your attention is hereby called to Sdction 21, Chapter 95, Session Laws 1903, which provides a heavy penalty for keeping on licensed premises adulterated liquor, or liquor which is other than it purports to be.

CYRUS H. LITTLE,
HENRY W. KEYES,
JOHN KIVEL.
State Board of License Commissioners.

CONCORD, N. H., November 1, 1912.

It may be mentioned that the penalty above referred to, applicable as well to sales of substandard or mislabeled goods as to more serious infractions, involves a fine of $200, and forfeiture of license and bond, with ability of renewal only after at least three years.

REGARDING REIMBURSEMENT FOR EXAMINATIONS UNDER THE LAW OF 1903.

By the terms of a recent order, compensation to the laboratory for examinations made for the commission has been denied. It may be pointed out that the Law of 1903, in designating that such examinations shall be made at the State Laboratory of Hygiene, expressly provides for the matter of compensation. (Section 10.) To assume that the sum mentioned is only applicable to defraying the "cost of reagents" is untenable. The chief expense in the operation of a laboratory, as in the operation of most departments, is the cost of labor. In the past it has been nothing unusual for the amount of work submitted under the above law to occupy a large portion of the time of one man. It should be appreciated, not only that full control of the operations of liquor inspection under the above law is vested in the commission, but also that this department has its own duties and responsibilities in connection with those inspections and investigations with which it is directly charged by law, and it is reasonable to assume that it is entitled to devote to such work the whole of the appropriation granted it.

It seems proper to suggest that a revision of the present laws effecting this matter would be advantageous. While I would not advise the enactment of any specific standards at this time, yet the provisions of the law of 1903 bearing upon this point are antiquated and ineffective and should be repealed in favor of those contained in the general food and drug law of 1907. This would result not only in harmonizing the work of the two departments, but would secure uniformity of

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requirements with that of the national law as well as with those of a majority of the states.

At present the State Board of Health and the State License Commission, in the matter of liquor inspection, may act independently, each under its own differing laws. It would seem, however, as though, in the interests of economical action, arrangement might be effected providing for joint control over the quality of liquors.

Respectfully submitted,

CHAS. D. HOWARD,
Chemist.

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BACTERIOLOGICAL DEPARTMENT.

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BACTERIOLOGICAL DEPARTMENT.

By Charles Duncan, M.D., *Bacteriologist.*

Following is a report of the bacteriological department of the State Laboratory of Hygiene for the two fiscal years ending August 31, 1912:

The records show that there was a material increase in the amount of work demanded during that period over any preceding like period, thus demonstrating the fact that the value of its investigations is being more and more appreciated by the physicians of the state for diagnostic purposes.

During the period named, 8,666 examinations were made, under the following classifications:

TABLE I.

Sputum	3,586
Throat cultures	3,932
Widal reaction, for typhoid	846
Suspected gonorrhœa	242
[1] Miscellaneous	60
Total	8,666

The above table does not include bacteriological examinations of water supplies or milk, as these results are given in the chemist's report.

It will be seen by the table that the greater part of the work was in making routine clinical examinations for physicians, chiefly in suspected cases of diphtheria and tuberculosis. Investigations, however, are made willingly of any conditions connected with public health questions. Some research work in the line of original investigations has also been done.

To be of the greatest possible aid to physicians in clinical work, bacteriological outfits must be so distributed throughout the state as to be of easy access. They are furnished free to all physicians, and are distributed by drug stores in the various towns and cities, as well as by some boards of health.

These outfits are such as have been approved by the postoffice authorities, and no other can be used under Federal regulations. There should be no lack of outfits in any town. Druggists should see that

[1] Under Miscellaneous examinations are included malaria, glanders, tissue examinations for tuberculosis, urines for typhoid bacilli, pus, and some unusual conditions to determine clinical questions.

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their supply is not exhausted. In localities where there is no such depository, outfits are mailed directly to physicians upon request. It is the purpose of the department to have supplies kept within convenient reach of physicians, and to do this the coöperation of druggists and of physicians themselves is necessary.

The laboratory has recently put up, for immediate forwarding, packages containing fifty or more outfits, to be used in taking cultures from the throats of school children.

The number of outfits sent out for the use of physicians, very largely exceeds the number returned to the laboratory, which seems to show a lack of economical care in this respect. We state this fact trusting that greater care may be exercised against the loss, which entails considerable expense upon the laboratory.

Tuberculosis.

During the period covered by the report, 3,586 specimens of sputum in suspected cases of tuberculosis were examined, an increase over any previous like period. Of these, 846, or 23.59 per cent., were found to contain the tubercle bacillus.

Table II.

Table II shows the number of specimens received from the different towns and cities. It is a noticeable fact that when influenza, colds and coughs are prevalent, the laboratory receives fewer tuberculosis specimens, yet this very time is especially favorable for the discovery of the tubercle bacillus, as in some instances, at least, it may be the primary cause of the so-called cold or cough.

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TABLE II.—TUBERCULOSIS.

	Positive.	Negative.	Total.
Alstead	7	9	16
Alton	0	1	1
Amherst	1	4	5
Andover	1	11	12
Antrim	0	4	4
Ashland	7	25	32
Barnstead	1	0	1
Bartlett	4	26	30
Bath	0	2	2
Bedford	2	1	3
Berlin	17	83	100
Bethlehem	0	2	2
Boscawen	1	3	4
Bradford	0	5	5
Bristol	5	3	8
Brookfield	2	2	4
Campton	1	0	1
Candia	1	5	6
Centre Harbor	1	5	6
Charlestown	6	11	17
Chester	0	1	1
Claremont	10	46	56
Colebrook	1	16	17
Concord	72	286	358
Deerfield	2	0	2
Derry	10	30	40
Dunbarton	0	1	1
Durham	2	8	10
Effingham	1	0	1
Enfield	2	5	7
Epping	3	12	15
Exeter	19	56	75
Farmington	9	34	43
Fitzwilliam	6	7	13
Franconia	0	7	7
Franklin	14	83	97
Freedom	1	2	3
Fremont	1	4	5
Gerrish	0	1	1

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TABLE II.—TUBERCULOSIS—*continued.*

	Positive.	Negative.	Total.
Goffstown	5	6	11
Grasmere	46	74	120
Gorham	1	4	4
Greenfield	0	3	3
Greenland	1	1	2
Greenville	6	7	13
Hampton	1	10	11
Hanover	9	38	47
Haverhill	3	2	5
Henniker	2	6	8
Hillsborough	9	22	31
Hinsdale	6	1	7
Holderness	0	1	1
Hollis	2	1	3
Hooksett	0	3	3
Keene	26	89	115
Kingston	2	2	4
Laconia	9	47	56
Lancaster	6	10	16
Lebanon	1	23	24
Lempster	0	2	2
Lincoln	4	16	20
Lisbon	5	8	13
Littleton	9	56	65
Loudon	2	0	2
Lyme	1	11	12
Madison	1	0	1
Manchester	139	356	495
Marlow	1	0	1
Meredith	1	3	4
Merrimack	1	0	1
Milan	1	2	3
Milford	8	4	17
Nashua	56	157	213
New Boston	0	4	4
New Ipswich	1	2	3
New London	1	8	9
Newmarket	4	4	8
Newport	18	37	55

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TABLE II.—TUBERCULOSIS—*concluded.*

	Positive.	Negative.	Total.
Northwood	1	5	6
Nottingham	3	0	3
Orford	1	2	3
Peterborough	1	0	1
Pittsfield	2	12	14
Plaistow	0	3	3
Plymouth	15	28	43
Portsmouth	21	134	155
Raymond	0	2	2
Rochester	4	23	27
Rye	1	0	1
Salem	0	5	5
Salisbury	0	0	1
Sanbornville	0	3	3
Sandwich	3	4	7
Somersworth	19	72	91
Stewartstown	2	14	16
Stratton	0	4	4
Sunapee	3	0	3
Suncook	19	34	53
Sutton	1	2	3
Swanzey	1	10	11
Temple	1	3	4
Tilton	3	11	14
Troy	3	16	19
Tuftonborough	2	0	2
Union	0	2	2
Walpole	3	10	13
Warner	0	5	5
Warren	0	2	2
Whitefield	6	21	27
Wilton	3	19	22
Winchester	1	6	7
Woodsville	2	12	14
Concord Institutions	36	54	90
	755	2,345	3,100
In addition, duplicate specimens	91	395	486
Totals	846	2,740	3,586

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Of the 846 cases in which the sputum was found to contain tubercle bacilli, 732 were from patients whose ages were given by the physicians as classified in Table III.

TABLE III.—SHOWING AGE AND SEX OF 732 POSITIVE CASES OF TUBERCULOSIS.

Ages.	Males.	Females.	Total.
0 to 10	2	5	7
11 to 15	2	9	11
16 to 20	31	45	76
21 to 30	153	124	277
31 to 40	106	95	201
41 to 50	57	38	95
51 to 60	34	8	42
61 years and over	13	10	23
Total	398	334	732

The above table shows most emphatically the ravages of tuberculosis, in that it takes from the community a large percentage of its victims at the most productive period of life. This is even more vividly shown in Table IV, by percentages.

TABLE IV.—PERCENTAGES OF DEATHS FROM TUBERCULOSIS BY AGE PERIODS.

Ages.	Percentages.
0 to 20	12.9
21 to 40	65.3
41 years and over	21.8

The reports of the physicians at the time of sending the specimens to the laboratory, showed that 455 of the patients were at that time unable to perform any labor, while 210 were at work. The condition of 67 in this respect was not stated.

DIPHTHERIA.

The total number of throat cultures examined was 3,929 of these 651 contained diphtheria bacilli. The number of cultures received from the different cities and towns is shown in Table V.

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TABLE V.

	Positive.	Negative.	For Diagnosis.	For Release.	Not Stated.
Alstead	3	7	6	4	.....
Alton	1	4	4	1	.....
Amherst	.....	6	3	3	.....
Antrim	1	5	5	.....	1
Andover	.....	9	8	1	.....
Ashland	2	19	17	4	.....
Barnstead	0	5	3	0	2
Bartlett	5	11	8	8	0
Bellows Falls	0	3	0	3	0
Belmont	3	14	15	2	.....
Berlin	57	133	51	136	3
Bethlehem	1	2	3	.....	.....
Bradford	4	7	1	7	3
Bristol	1	4	1	4	0
Brookline	10	19	1	19	0
Campton	1	3	3	0	1
Charlestown	3	8	6	5	.....
Chester	2	4	6	.....	.....
Claremont	5	18	13	7	3
Concord	96	1,050	748	282	106
Center Harbor	0	10	5	3	2
Dover	8	53	58	3	.....
Derry	7	20	15	10	2
Deerfield	0	1	1	0	0
Exeter	8	22	17	9	4
Epping	0	2	2	0	0
Epsom	0	2	2	0	0
Farmington	2	17	16	2	1
Fitzwilliams	0	3	3	0	0
Francestown	1	2	1	2	0
Franconia	1	4	4	0	1
Franklin	43	158	95	102	4
Freedom	0	4	0	4	0
Goffstown	2	21	13	8	2
Gilmanton	2	7	4	2	3
Goshen	9	12	.....	19	3

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TABLE V.—*Continued.*

	Positive.	Negative.	For Diagnosis	For Release.	Not Stated.
Grantham	0	1	0	1	1
Grasmere	0	4	2	0	2
Greenland	4	5	1	0	2
Greenfield	2	4	4	1	1
Greenville	2	1	1	1	1
Groveton	8	13	12	9	1
Hampstead	0	2	2	0	0
Hanover	6	49	44	9	3
Haverhill	5	5	3	6	1
Henniker	0	1	1	.....	.....
Hinsdale	1	10	6	5	.....
Hillsborough	4	17	15	5	1
Hooksett	1	3	4	.....	.....
Hopkinton	0	1	1	.....	.....
Hudson	0	4	3	.....	1
Jaffrey	12	53	25	38	2
Keene	14	52	49	6	1
Kingston	1	0	1	.....	.....
Laconia	13	40	34	18	1
Lakeport	6	27	13	17	1
Lancaster	4	5	2	6	1
Lebanon	3	2	10	13	2
Lempster	3	51	10	43	1
Lincoln	5	10	13	2	0
Littleton	22	72	43	49	2
Lisbon	2	12	14	.....	.....
Londonderry	0	3	2	1	.....
Loudon	.....	.....	1	1	.....
Lyme	.....	3	2	0	1
Manchester	46	265	199	90	22
Mason	0	1	0	1	.....
Meriden	.....	1	1	.....	.....
Meredith	6	14	7	12	1
Milford	37	109	64	74	8
Nashua	25	165	87	63	15
New Boston	4	14	4	14	0

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TABLE V.—*Continued.*

	Positive.	Negative.	For Diagnosis.	For Release.	Not Stated.
New Castle	1	0	1	.....	.....
New London	.....	3	2	.....	1
Newmarket	.....	2	1	.....	1
Newport	8	55	43	38	.....
Northwood	2	42	7	34	3
Orford	.....	13	9	4	.....
Peterborough	.....	.....	1	1	.....
Plaistow	.....	3	3	.....	.....
Plymouth	.....	11	10	1	.....
Portsmouth	13	104	70	42	5
Rochester	18	76	59	31	5
Troy	2	7	6	3	.....
Rumney	0	3	1	0	2
Salem	1	1	1	0	1
Somersworth	1	18	14	5	.....
Stewartstown	1	12	6	7	.....
Stratford	19	52	24	41	6
Suncook	1	9	8	2	.....
Sutton	4	7	2	8	1
Swanzey	0	1	1	0	.....
Tilton	1	9	10	0	.....
Tuftonborough	1	3	2	2	.....
Union	7	6	9	4	.....
Walpole	2	15	13	4	.....
Warner	0	7	7	0	.....
Warren	2	7	8	1	.....
Whitefield	2	4	4	2	.....
Wilton	42	94	65	49	22
Winchester	0	5	5	0	.....
Windsor	0	1	1	0	.....
Wolfeboro	4	12	14	2	0
Woodstock	4	2	1	3	2
Woodsville	0	6	2	3	1
White River Junction or Lebanon	2	8	10	0	.....
Totals	651	3,278	2,238	1,421	263

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The following table shows the laboratory results in 1,450 cases in which the attending physician made a definite statement of diagnosis from clinical symptoms only:

TABLE VI.

Clinical Diagnosis.	Total cases.	Laboratory Examination.	
		Positive.	Negative.
Diphtheria	390	250	140
Not Diphtheria	939	95	844
Doubtful	121	23	98
	1,450	368	1,082

The following table exhibits by percentages the difference between the clinical diagnosis and the results of the laboratory examination:

TABLE VII.

Clinical Diagnosis.	Laboratory Examination. Percentages.	
	Positive.	Negative.
Diphtheria	64.10	35.89
Not Diphtheria	10.11	89.88
Doubtful	19.00	80.99

These figures demonstrate what has been proven over and over again, namely, that it is absolutely impossible to make a correct diagnosis in many, and perhaps in most, cases of throat infection from the clinical symptoms alone.

Frequently an exudate is present when the culture is negative so far as diphtheria is concerned. Of the cases with a clinical record of exudate or membrane, 40 per cent. proved positive in culture; while of the cases with a clinical record of no exudate or membrane, 12 per cent. proved to be positive diphtheria in culture. This would appear to indicate that antitoxin should be administered in cases in which an exudate or a membrane is present, and that the case should be held as "suspicious" until at least three negative laboratory reports have been obtained.

Before making cultures from the swab, an examination by smear is always made for the diphtheria bacillus, and yields results in approximately 45 per cent. of cases, with a saving of time of from 14 to 16 hours in making a report.

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Typhoid Fever.

The laboratory examined 845 specimens of blood for the Widal reaction 170 (20.1 per cent.) were positive. The table following shows cities and towns from which specimens were received.

The strains of typhoid bacilli used for Widal are from different sources, and several different strains are used on same sample of blood but we find that the percentage of positives remain the same. Occasionally differences in the power of some bloods to clump the different strains are noticed. If sufficient blood is sent to the laboratory in the container a bile growth is made from the clot but here again the percentage of positives remains the same.

Of the 170 cases reported positive, 89 (52.3 per cent.) the doctor made a positive diagnosis of typhoid fever and 81 (47.6 per cent.) did not state any opinion as to diagnosis.

Of the 675 cases reported negative, 288 (42.6 per cent.) stated the case to be one of typhoid fever; 387 (57.4 per cent.) did not give any opinion as to diagnosis.

TABLE VIII.

	Positive Widal Reaction.	Negative Widal Reaction.
Doctor's diagnosis typhoid	89 (52.3%)	288 (42.6%)
Doctor's diagnosis not stated	81 (47.6%)	387 (57.4%)

The above table shows that in about one half the cases sent to the laboratory for the Widal reaction the diagnosis of laboratory is at variance with the diagnosis written on the card, and *vice versa*. It is difficult to harmonize this fact with our knowledge of the value of the Widal reaction but we surmise that, considering the actual number of cases of typhoid fever reported to the State Board of Health, that the laboratory finds positive Widal reactions in the requisite number of bloods sent from actual cases as they afterwards develop.

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TABLE IX.—TYPHOID FEVER.

	Positive.	Negative.	Total.
Alexandria	1		1
Alstead		1	1
Andover		7	7
Ashland	2	4	6
Bath		1	1
Berlin		10	10
Bristol		5	5
Bradford	1	1	2
Center Harbor		5	5
Charlestown	1	1	2
Claremont	17	28	45
Concord	28	128	156
Conway	3	2	5
Derry		2	2
Dover	5	20	25
Durham		1	1
Enfield	1		1
Exeter	1	10	11
Francestown		2	2
Franklin	2	25	27
Freedom	0	1	1
Farmington	3	16	19
Gilsum	0	2	2
Goffstown	0	1	1
Grasmere	0	3	3
Greenville	0	3	3
Groveton	1	0	1
Hanover	6	20	26
Harrisville	0	1	1
Haverhill	0	1	1
Henniker	0	1	1
Hillsborough	6	33	39
Hinsdale	1	1	2
Hooksett	1	1	2
Keene	15	45	60
Laconia	3	12	15
Lancaster	1	2	3
Lebanon	9	13	22

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TABLE IX.—TYPHOID FEVER—*Continued.*

	Positive	Negative.	Total.
Lisbon	1	7	8
Littleton	8	40	48
Meredith	0	1	1
Milan	1	1	2
Milford	0	1	1
Milton	0	2	2
Nashua	5	28	33
Manchester	12	72	84
New Boston	0	0	0
New London	0	4	4
New Market	1	0	1
Newport	3	1	4
Ossipee	2	0	2
Orford	4	5	9
Peterborough	2	0	2
Plymouth	4	14	18
Portsmouth	4	42	46
Raymond	0	2	2
Rochester	2	3	5
Rumney	0	2	2
Sanbornville	0	4	4
Spofford	0	1	1
Somersworth	2	3	4
Stewartstown	1	4	5
Strafford	1	0	1
Suncook	1	3	4
Sutton	1	3	4
Tamworth	0	1	1
Walpole	0	4	4
Warner	0	1	1
White River Junction (Lebanon)	4	6	10
Wilton	0	2	2
Winchester	1	0	1
Wolfeboro	0	3	3
Woodsville	2	5	7
Woodstock	0	1	1
Total	170	675	845

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Gonorrhea.

Two hundred forty-two specimens of pus mostly from genital organs, a few were from the eye, were examined for gonococci. Ninety-four (38.8 per cent.) were found to be positive. The laboratory calls the case positive only when the diplococcus is found within the pus cell and is responsive to Grams stain. The greater number of the positive specimens were in males between the age of 20 and 30. Only 32 were from females. Fifteen were from children under ten years of age. Nine were from the eye. Two were from patients over seventy years of age.

The number of towns that make use of the laboratory for this test are too few—only twenty-five in number. We can hardly believe that it is generally understood that this test is made by the laboratory free of charge and that a regulation outfit is furnished. It is advisable that more physicians take advantage of this test examination. There is such a thing as a urethritis due to bacteria other than the gonococcus and the patient should have the benefit of the doubt.

TABLE X.

No. of examinations.	Positive.	Negative.
242	94	148
Eye Specimens.	Urethral.	Vaginal.
9	210	321

Infectious Diseases of Animals.

The laboratory is frequently called upon to examine specimens from animal sources, this includes, besides milk already mentioned, tissues of various kinds, pus and other discharges from diseased cattle, sheep, fowls and swine. Eight specimens showed the presence of tubercle bacilli; two revealed the presence of parasites, and two of inflammation. Examinations for glanders are frequently made in the laboratory, through inoculation of Guinea pigs from specimens of the product received. The laboratory has no outfit designed especially for the collection of specimens from glandered horses, but the ordinary diphtheria outfit, which can be obtained at any supply station, answers every purpose.

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Malaria.

Thirty-three specimens of blood were examined for malaria. One case, only, was found to carry the organism of this disease. The type was *Aestivo-Autumnal.* The mosquito (*Anopheles*) carrier of this disease is present in some localities of this state.

Typhoid Urines.

The laboratory is always ready to make urinary examinations in cases suspected of being typhoid bacilli carriers. Six such cases were examined during the period covered by this report, two of which were positive and four negative.

Miscellaneous Examinations.

The results of the work of the bacteriological department on milk, cream, ice-cream and public and private water supplies is included in the report of the state chemist.

The examination of milk, cream and ice-cream consists of a bacteriological count for care and cleanliness in the production and distribution of these products. The report includes work done for the Granite State Dairymen's Association, which yearly offers prizes for the best milk or cream submitted.

The examination of milk for tubercle bacilli is not routine work. That there are being sold in open market milk and cream containing these germs, there can be no doubt. Of thirty samples submitted from one city supply, two contained tubercle bacilli. The relation of the germ of bovine tuberculosis to that of man is an unsettled question, but enough has been determined to warrant the exclusion of milk from tubercular cattle from domestic use.

The laboratory test for the germ of tuberculosis consists of the inoculation of Guinea pigs with milk sediment obtained by the centrifuge. If the bacilli are present, the animal very soon develops the disease.

All samples of water from public and private supplies receive an examination for presumptive evidence of contamination from human excretions. This consists in most cases of the gas test in bile media; but in some cases a bacteriological count is made.

At present, the state does not make any routine bacteriological efficiency tests for the various filter plants in the state; but this work is contemplated for the future.

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MISCELLANEOUS.

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REPORT OF INSPECTOR WALLACE E. PURRINGTON.

The Legislature of 1909 enacted a law providing for a sanitary inspector to act under the direction of the State Board of Health. At that time his powers were limited, as no provision was made for allowing for any police action.

Mention was made in the last biennial report of the fact that the State Board of Health was unable to put some very filthy slaughter houses in a reasonably sanitary condition. As a result of the session of 1911, an act was passed to govern the sanitary production and distribution of food stuffs. The law, as passed, was very broad, providing that the State Board of Health should have power to make such regulations as might be deemed necessary for its proper enforcement.

Since May 9, 1911, the following lines of work have been taken up:

1. The covering of food stuffs liable to the attack of flies, worms or dust inside of stores.
2. The covering of such fruits on the sidewalks as are ordinarily eaten without removing the skins or parings.
3. The removing of hogs from beneath, and the cleaning up of slaughter-houses.
4. Stopping the practice of washing glasses in sinks containing dirty water, in the saloons of the state.
5. The wrapping of bread.
6. Remedying unsanitary places and methods in the production of food stuffs.
7. The examination of milk-producing establishments.

The following table will show something of the work actually accomplished:

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RESULT OF SANITARY INSPECTIONS, 1911-1912.

Places Inspected.	Non-conformable, 1st Inspection.	Satisfactory at Subsequent Inspection.
Bakeries:		
Bread unwrapped	86	50
Pastry uncovered	19	11
Candy, nuts, etc., uncovered	9	5
Dirty bakery	3	1
Fruit and Candy Stores:		
Fruit exposed to flies, dust, and dirt on sidewalk	67	42
Candy, nuts, and fruit uncovered	85	61
Selling cut, decayed fruit	1	1
Unsanitary conditions	3	0
Slaughter Houses:		
Unsanitary conditions, due to filth and hogs	48	23
Drug Stores:		
Candy and shelled nuts uncovered	23	21
Grocery, Market and Department Stores:		
Pastry, candy, shelled nuts, etc., uncovered	170	115
Fruits Exposed on Sidewalk	9	7
Meats and pickles uncovered	95	58
Filthy conditions	10	5
Bread unwrapped	16	12
Meat cart, dirty	1	0
Milk room, dirty	1	0
Candy factory	1	0
Saloons:		
Glasses not properly washed	245	219
Total	892	631

It will be seen that the subsequent inspection showed that 71 per-cent. of the faulty conditions had been remedied. It is quite probable that there would have been a still larger percentage of improvements but for the fact that new construction, in the shape of alterations and the building of cases, was necessary. Later inspections, while not tabulated, showed that a very large percentage of those who did not comply at first, later met the requirements.

Previously to the passage of the law for the sanitary production and distribution of food stuffs, nearly every grocery, market, fruit and candy store in the state exposed such articles as candy, shelled nuts, dates, figs, berries, pastry, etc., to the attacks of flies and insects, and to the collection of dust. The result of the enforcement of the law and the regulations, has been that dealers have put in show-cases and covers which, in a great part, are permanent fixtures. The regulation requiring the covering of meats, has brought out several types of display cases.

A type of case which is giving excellent satisfaction was built and put in operation by the People's Market System of Laconia, Rochester and Dover, is illustrated.

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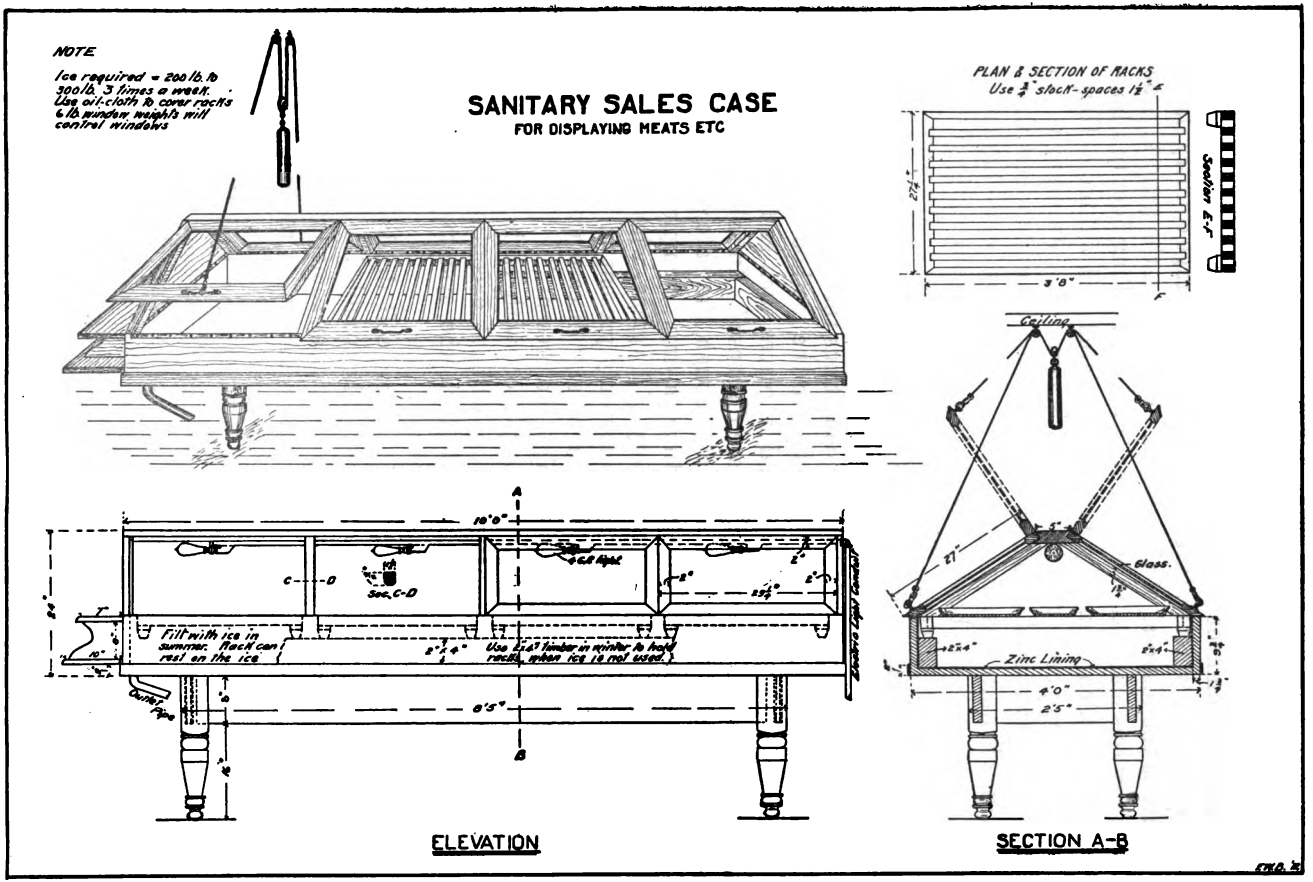

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One of the most flagrant conditions was in connection with fruits exposed to street dust and flies. The dealers complied with the law by using permanent covers.

Perhaps the worst feature pertaining to the average country slaughter house is the disposal of the viscera. It has been the general practice to allow this material to be dropped under the killing floor to a hog-pen beneath, which is usually poorly ventilated and lighted. Here the refuse decomposes, and the stench is powerful. As meat is one of the best absorbents of odors, it can readily be understood that this practice is quite unsanitary. This condition has been eliminated by the removal of the hogs to some place not adjacent to the slaughter-house, and the disposal of the offal in other ways. By wainscotting the slaughter-rooms, and the use of paint and whitewash, the places can be kept fairly clean and sweet.

While investigating unsanitary conditions throughout the state, the attention of the inspector was called to the method in vogue for the cleaning of glasses in saloons, and in places such as fruit stores and grocery stores where soft drinks are dispensed. In saloons, the practice is to wash the glasses in a tub or a trough, the water being changed, sometimes, no more than three times a day. Samples of this water were taken to the State Laboratory of Hygiene, where it was found to contain "such germs as are commonly present in the mouth and throat, although no germs specific of any disease were found; still, this is proof positive that such might be present."

The matter was taken up in person with each saloon keeper, and, as a result, they have, almost without exception, installed an automatic rinser, and are pleased with the system, while the customer is protected from disease germs.

In the fruit stores and groceries where soft drinks are dispensed, very inadequate facilities are in use. The trouble is not so much that glasses are washed in dirty water, as that they sometimes get no washing at all. In these cases, paper straws have been recommended, so that the customer may drink directly from the bottle.

The average person is made aware of the fact that there is a law for the better protection of food stuffs, by the regulation requiring the wrapping of bread. As considerable bread is shipped into New Hampshire from Maine, Massachusetts and Vermont, a little difficulty was encountered here, owing to the Interstate Commerce regulations. As New Hampshire has no jurisdiction as to the manner in which shipments from neighboring states shall be made, the matter was put up to the dealers to whom the bread was shipped in this state.

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As the grocer is only too glad to have the bread wrapped (since it keeps moist considerably longer), and is a cleaner way for him to handle it there was no difficulty in securing coöperation in enforcing the regulation.

Legal action was brought against one dealer for failure to wrap his bread, as required by the regulations which had been promulgated. The State Board of Health won the case in the municipal court, when the defendant appealed to the Superior Court, where it was tried out, the state again winning the case. The case was further appealed by the defendant to the Supreme Court; therefore, for the present, pending the decision of that court as to whether or not the State Board of Health has exceeded its powers in requiring bread to be wrapped, no legal action is being taken against the few dealers who are not complying with the order.[1] One very reputable dealer in the state has declared that the wrapping of his bread has greatly increased his business. This does not seem an exaggeration, after seeing bread carried through the streets in open boxes or on top of wagons, in all kinds of weather, and being handled by drivers who have no chance to keep their hands clean.

In making inspections of food-producing establishments, many cases are found that require special treatment, the scope of the law being very broad. Two illustrations will suffice: A creamery visited during the past year was found to be in a very unsanitary condition. The butter machines were kept in the same room in which a horse treadmill was operated. The attention of the inspector was called to the place by a resident of another town, through the fact that reddish hairs were found in the butter as purchased. Wholly inadequate facilities for washing the machinery and cans, made this an unfit place for the production of dairy products. Suggestions were made to the owner, and a subsequent visit showed that they had been carried out to the satisfaction of the inspector.

A sausage factory had an open privy in the room where all the preparation of the meat was carried on. In all but a very few cases, the manufacturers and merchants throughout the state have been very willing to meet the requirements of the regulations, and by taking up each condition with them in person, there is a through understanding among all parties.

[1] Since going to press with this Report the Supreme Court has rendered a decision sustaining the action of the State Board of Health.

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FARMINGTON SEWER PROBLEM.

Until recently, Farmington has had no public sewer system. The conditions resulting from a lack of proper sewering became so bad that numerous complaints were presented to the State Board of Health, and probably many more to the local board.

Early in 1911, the town voted to adopt the provisions of chapter 79 of the Public Statutes, relating to sidewalks and sewers, and to install a sewer system—with the understanding that it should be discharged into the Cocheco River. Following this action on the part of the town, several petitions were presented to the State Board of Health protesting against the polluting of that river, in view of the rights of riparian owners and the fact that ice for the city of Rochester is taken from the said river. The board received many communications relative to the matter, and sent an inspector to look over the entire situation.

The position of the State Board of Health was emphasized in the following letter addressed to the Board of Selectmen of Farmington:

CONCORD, N. H., August 11, 1911.

Board of Selectmen,
Farmington, N. H.

GENTLEMEN:—At a meeting of the State Board of Health, held on Wednesday, August 9, instant, there were presented numerous protests against the town of Farmington's constructing sewers to empty into Cocheco River. These objections are raised by riparian owners, who allege that such a course would work injury to them. Protests have also been filed by parties in Rochester who cut ice from Cocheco River.

I was directed by the board to suggest to you that before you begin the construction of sewers, as authorized by vote of your town, you submit your plans to the State Board of Health for approval.

We will gladly assist you as far as possible in solving the problem in the best possible way, and to that end we will, if necessary, furnish an expert sanitary engineer to study the topographical and sanitary conditions involved, which are an important feature in deciding the question before you.

Per order,

(Signed) IRVING A. WATSON,
Secretary.

In accordance with the offer of the board to send a sanitary engineer to make further examinations and to advise the town authorities, the board of health of Farmington made the request, and in compliance therewith, the board authorized Prof. Robert Fletcher, civil

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and sanitary engineer, and a member of the State Board of Health, to visit the locality and make recommendations in behalf of the State Board of Health.

Following is a copy of Professor Fletcher's communication to the Board of Selectmen of Farmington:

FARMINGTON, N. H., August 22, 1911.

The Selectmen of Farmington.

GENTLEMEN:—At the request of the secretary of the State Board of Health, and with your concurrence, I have looked over the situation here in relation to the question of *sewage disposal.* While I have not had sufficient time or opportunity to go thoroughly into details, there are certain broad and general aspects of the situation which are so evident, in my opinion, that conclusions may be formed and stated without hesitation.

Let me first acknowledge indebtedness to the excellent map and profile prepared by Lloyd and Mann, civil engineers of Concord, N. H., without which it would not have been possible to make the calculations on which some of the conclusions are based, without taking time for a special survey.

First Conclusions. I cannot assent to the proposition that it is admissible to turn the raw sewage from Farmington into the Cocheco River. The time must soon come when the people of the state, by their Legislature, will prohibit the emptying of untreated sewage into any stream to the detriment of the riparian rights of owners lower down. Meantime all abutters have, in common law, the right to the reasonable use of the unpolluted waters of the streams and lakes. The argument for the proposition is that the Cocheco River will *dilute* the sewage enough to render it harmless. But brief consideration will show that this is not so.

Two leading sanitary authorities of the United States aver, as a result of long observation, that a stream *may* purify one fiftieth of its volume of sewage, but not one twenty-fifth. Since your river has not a uniform channel or slope, and has a succession of pools, and a rough bed, it would not be safe to allow less than fifty as a multiplier for dilution. I have just seen the stream when it was admittedly not at its lowest flow, because water was coming in from the canal. The average velocity was considerably less than 1 foot per second and apparently the average depth less than ½ foot for a width of 12 feet. It is very doubtful if the flow was 2 cubic feet per second, which for 16 hours of a sewage day would be 864,000 gallons,—call it one million gallons per day. Now for present conditions allow a sewage discharge of 65,000 gallons in 16 hours (for reasons to be stated soon) which multiplied by 50 gives 3¼ million gallons. This shows that a flow of the stream not by any means the lowest gives less than one third of the proper dilution. Of course a larger consumption of water and greater sewage discharge would be even worse.

But a more serious aspect of the case is the danger from typhoid patients in your town. If the sewage is infected by typhoid bacilli,—as it would be if you had cases,—not any amount of dilution would remove the danger to inhabitants lower down (the river being not very long at most), if they took water or ice from it for household use. In short, if I were a citizen and taxpayer of your town I should oppose any action which would probably lead to legal difficulties, court injunctions, etc. Experience in similar cases shows that much sewage is held in the pools where it stagnates, putrefies and makes an intolerable nuisance which provokes just complaint and recourse to law.

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Second Conclusion. The sizes of pipe adopted in the plans submitted to your town are altogether too large and would be needlessly expensive. The 18 inch pipe on the lowest grade adopted would discharge about 1½ million gallons per day and serve a population of 20,000 people if every single one used 50 gallons per day.

I have before me a design for a pipe sewer system for Schenectady, N. Y., for a district having a population of 5,000, requiring about three miles of main sewers. The largest main used was 12 inches in diameter and the grades were generally as low as your lowest, that is 0.3 per cent. or about 3½ inches per 100 feet. These sewers were designed to discharge 565,000 gallons per day, *running half full.* And let me say here that it is common practice in such designing to figure for pipe only half full at the time of average maximum daily flow, which is assumed at 150 per cent. of the mean daily flow for 24 hours; or a maximum rate of discharge equal to the discharge of the sewage of 24 hours in 16 hours. A 10 inch main on your outfall of a quarter of a mile below your lowest house, on the grades you have, would discharge nearly 300,000 gallons in 24 hours, which would suffice for 6,000 people if each one used in a day 50 gallons, or the contents of a kerosene oil barrel. At times of maximum flow it might run a little more than half full for so many people.

It goes without saying that the capacity of sewer provided must correspond to the amount of water which will probably or possibly be delivered to it from all sources. Inquiry at the factory of the Farmington Shoe Company develops the fact that they now use by meter measurement less than 10,000 gallons per week. With closets put in and free use of water resulting, this might be increased to 30,000 gallons per week or 5,000 gallons per day. If the other factories used in like proportion we might have 20,000 gallons per day, for about half of the population. Suppose 1,200 additional residents used *each* 25 gallons per day, we would have 30,000 gallons more. Add 50 per cent. to this for use of stables, stores and waste, and we have a total of 65,000 gallons. This is less than one quarter of what a 10-inch main running *half full* would deliver, as shown above.

Your engineer at the pumping station says that the amount pumped per day is from 100,000 to 125,000 gallons. But your officials state that about 25,000 gallons per day is used for sprinkling streets; also from 10,000 to 20,000 gallons per day for sprinkling lawns. Moreover, what is used for washing carriages would not go to the sewer; and I am told that about one quarter or more of the dwellings on the outskirts of the village would not be likely to connect with a sewer. Considering all of these conditions the estimate of a sewage flow of 65,000 gallons per day seems to be liberal.

If the whole of this flow passed through only a 6-inch pipe in 16 hours, on your lower grade of 0.4 per cent., it would have a velocity of 2 feet per second and fill the pipe only half full. So that even a 6-inch main, a mile long, would take care of 100,000 gallons per day without choking. As a matter of fact it would discharge 130,000 gallons per day with a depth of only 5½ inches in the pipe, that is, with the pipe not quite full.

It is self-evident that the smaller pipe having a greater *depth* of flow would be much better flushed and therefore be always cleaner. *Note well* that 65,000 gallons per day is more than a flour-barrel full for every man, woman and child in your village.

Therefore, although I would guarantee the sufficiency of a 6-inch main sewer for a system of any extent which would you ever be likely to build here; *nevertheless*, because it looks small to the public eye and might cause too much criticism I would

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increase the size somewhat. Referring to the engineer's plan heretofore submitted to your board, I would replace the 18-inch main by *10-inch*, the 15-inch main by 8-inch and the 10-inch main by 6-inch. Then the ordinary capacity would be 300,000 gallons per day; but the possible capacity flowing nearly full would be 612,000 gallons per day; which would serve 20,000 people if each used a barrelful of water daily. Of course, this assumes that all garbage and refuse of every kind that will not pass a 1½ inch trap is to be rigidly excluded from the pipes.

The Third Conclusion relates to a *practicable method of disposal.* This can only be stated now in a general way. To explain it in detail requires drawings and specifications. Briefly, it requires firstly a sewage tank, otherwise termed a regulated cesspool or digester, and secondly, prepared drainage trenches for taking care of the tank effluent underground. By this means the sewage may be so altered and partially purified that it would not be liable to cause offense in the river. The constitution of your soil here is quite suitable for such a process.

The tank need not be more than 45 feet long by 12 feet wide, and would be mostly below the ground surface. Covered by a low building it would not be conspicuous and would not be so offensive as a garage. The trenches would require about 600 feet of 3-inch and 4-inch drain pipe and a grading of the materials so as to make them act as underground filters.

To recapitulate:

First.—To discharge your sewage into the river would convert it into an open sewer, which would be injurious to the public welfare through the entire lower Cocheco valley. In my official capacity I oppose it.

Second.—The sizes of pipe needed for any sewer system you would ever require need not be larger than 10-inch, 8-inch, and 6-inch for the main lines. House connections usually 5-inch.

Third.—A proper system of disposal can be put in for what would be saved by adopting the smaller pipe,—that is for $1300, or less. The land needed would be less than half an acre.

Respectfully submitted,

(Signed) ROBERT FLETCHER,
Civil Engineer.

Director of Thayer School of Civil Engineering, Dartmouth College, Member of State Board of Health.

Although we have no official report of the construction of the sewer system, we understand that the recommendations were adopted and the sewer system constructed by an engineer and contractor within the amount appropriated, and, so far as we can judge from reports, the system is working satisfactorily.

While this volume is in press, we have made an inquiry of the local board of health of Farmington, and, in reply, they say that, on the whole, everyone is well satisfied with it; that they are unable to find anyone who finds fault with it, although there may be some little "outs" about it which will undoubtedly be remedied as soon as they can get at it; but that, as a matter of fact, everyone concedes that it is a great public improvement.

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THE SEWER PROBLEM IN WOLFEBORO.

The problem of sewering the village of Wolfeboro without contaminating the lake shore has long confronted that town and has been given considerable attention, without material results. All the plans hitherto considered have been of too expensive a nature to be practicable.

The matter was taken up by the State Board of Health, and, at its request, Robert Fletcher, civil and sanitary engineer, was requested to make an inspection of the locality, which he did in May last, submitting the following report. The postscript to the report was added while this volume was in the hands of the printer:

HANOVER, N. H., May 31, 1912.

Dr. I. A. Watson,
Secretary of State Board of Health,
Concord, N. H.

MY DEAR SIR:—After inspection of the sanitary conditions in and about Wolfeboro, where I went at the request of the local board of health, it is in order to make a brief report to the office of the State Board, first, as a matter of record, and, second, to serve as a basis for future action if any should be needed.

Although you have personal knowledge of the situation, and our state inspector has recently initiated a course of procedure there, a brief description is a necessary prelude.

The village is much spread out, chiefly on both sides of a main street considerably more than a mile long and on which the greatest elevation is more than 150 feet above the level of Lake Winnipesauke. Many houses are located along the lake shore, where also are numerous boat houses and small wharves and landing places.

The most central place, if it may be termed such, is about the railroad station, where the Smith River, which drains Wentworth Lake on the east, debouches into the lake. Main Street crosses this by a low bridge, and under this bridge the drainage from numerous houses in the vicinity is discharged, including that from the principal hotel, business blocks, etc. This Smith River widens out into a sort of bay on the east through which the railway passes on an embankment, and this "fill" cuts off a portion of the bay in such wise that the only communication with the main body of water is through an inadequate culvert under the railroad. The only shoe factory in the place, employing about 150 people, is directly on the margin of this shut-in bay, besides several houses scattered along close to the water's edge. The drainage from the factory and all the numerous houses of this "back bay" district is directly into this enclosed cove, where the water derives no benefit from the wave action in the larger body of water, and so must be much of the time in a stagnant condition. The Brewster Academy occupies a tract of forty acres, having a frontage on the lake of nearly half a mile; but the buildings are high above and so far away from the lake that the drainage of that institution can be properly cared for on its own premises.

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The town has a gravity water supply of unexceptionable quality and practically unlimited quantity from a natural mountain pond, four miles away; and this is so well distributed to all of the permanent residents that none of these is obliged to use the lake water for household purposes.

Old residents state that there has been no essential increase in the population of the town,—1200 to 1500 in the village,—during the past twenty years or more, and that there is not much prospect of any decided increase in the near future. But there is a large influx of summer visitors. The travel by automobiles keeps the hotels busy, regular summer visitors fill the boarding houses, and many city people and other outsiders own summer cottages along the lake shore. The latter have to use the lake water for household purposes, unless they dig wells just back from the margin, and so minimize the possibility of contamination. An old resident, familiar with local conditions, says that this is commonly done. The same authority tells me that these conditions have been about the same for twenty-five years or more, excepting an improvement gradually brought about within the past few years by a considerable disuse of privies and adoption of cesspools instead. These conditions have not been considered as being particularly unhealthful; but during the past two or three years the lake level was drawn down so that it was lower last summer than "ever before known"; and thus all the unpleasant features due to stagnation and high temperature of the water were greatly aggravated. During the past winter and spring the opposite extreme has come about; the water is now (in this spring and early summer), four feet or more higher, or almost "higher than ever before known"; all conditions are at their best; the waves wash the high margins thoroughly; scarcely anything offensive is visible even near the outlets of drains; in short, the full effect of the principle of sewage disposal by "unlimited dilution" is effectively secured.

The constitution of the soil and subsoil is practically clay; about two feet below the surface it is what they term "hard pan," or blue clay, in places a true brick clay. Cesspools in such material are tight, of course. Sand and gravel can be procured by hauling. The town has a convenient quarry in the village and a stone-crusher there placed, so that broken stone can be supplied cheaply.

Dr. N. H. Scott, Doctor Tobey, and Mr. Doe of the local board of health took the writer in a carriage to view the most important features of the situation between two and six p. m. of the 29th. instant. A short interview was had with two of the selectmen at their office in the town hall. In the evening at a meeting with a few leading citizens, the more essential aspects of the general question of sewage disposal and the special features of the local situation were discussed, questions were answered and suggestions made.

The conclusions forced upon the writer after due consideration of what was seen and heard during this brief inspection may be stated as follows:—

First. A very considerable number of house owners on the higher land can care for their sewage on their own premises, at their own expense by sewage tanks or regulated cesspools; but, whenever the overflow from such is liable to affect their neighbors unpleasantly, such should be built according to well-approved plans by which the tanks and prepared drainage trenches are entirely covered and the effluent absorbed under ground. In some cases it is possible for two or more owners to combine and have a tank in common, if they can agree to share the cost and oversight.

Second. The location of the tank put in last fall, under direction of the inspector for the state, was chosen without due regard to the exceptionally low stage of the

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lake level. A rise of four feet in that level keeps the water level in the tank so high that the siphon chamber is now drowned and the siphon cannot operate. It was thoroughly well built, is a fine piece of work, and at present entirely unobjectionable. It was uncovered for inspecton and no disagreeable odor was perceptible, and the characteristic scum of septic action was well developed. At that place it was necessary to put it in the street, and it was not practicable to put in a goose-neck vent without raising proper objection from the adjoining owner whose front door is directly opposite and near by. But thus far a perfectly tight reënforced concrete cover buried under road material seems to work well.

Third. It is evident that one or more street sewers, serving many residences, could be built to discharge into tanks near the lake level but suitable location for such tank or tanks is not readily found and private interests must be dealt with if a location off from the street should be chosen. A street location could hardly be made acceptable to a prejudiced public, although not out of the question from our point of view, if properly built.

Fourth. The crux of the situation lies in the fact that so many houses and establishments are already so close to the shore, or even directly on the edge, that the occupants must perforce discharge their drainage into the lake or its immediate tributaries. If it were a governing condition that all household drainage must be excluded from the lake absolutely, as at South Framingham, Mass., then there must be an intercepting sewer all along the extensive water front, some construction for final collection (or a delivery into the lake at some suitable place), and works for disposal by treatment. Such a scheme, correct from theoretical requirements of sanitary engineering, would be financially very burdensome, if not impossible for this community.

If any comprehensive system is to be devised, the first requisite is a good contour map of the entire village, showing location and elevation of every building. From this a study of the situation would be easy and the possibilities made evident.

But the fact is that Wolfeboro is not alone. The problem of preserving the essential purity of Lake Winnipesauke on the whole extent of its borders is involved. The State Board has already taken action in regard to Alton Bay, which is perhaps effective for the time being. A definite and consistent policy should be adopted to govern not only at Wolfeboro, but at The Weirs, Center Harbor, etc., as well as at Winnisquam, where special regulation has been invoked heretofore. If necessary the Legislature should be called upon to have the entire problem considered by a commission, or by the State Board acting with special power delegated for this purpose, so that all parties interested around this and similar lakes of the state may be subject to uniform regulations.

Fifth. Since the sewage tank is at first thought inapplicable to houses close to the lake level, and since the State Board should not ask the town to incur expense for public sewers until the problem has been thoroughly studied, the writer declined to recommend any specific method of low-level disposal until the State Board has given the question more consideration.

Sixth. Meantime the responsible parties are ready to do whatever is reasonably proper. Some cesspools in this soil formation are already overflowing and creating nuisance. Others are proving satisfactory to the owners and giving no trouble. They should all be provided with drainage trenches and means of regulation, so that the discharges will be absorbed underground. Where houses are so close together that there is not room for this, a common sewer will probably be necessary in the

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end,—for such district,—with means of disposal by tank and trenches or otherwise, at a suitable point. The local board should be able to deal with such cases, backed and advised by the State Board where necessary.

Seventh. The larger problem involves the question whether the principle of disposal by practically unlimited dilution, which is now and has been for years in practical operation at Wolfeboro, shall be sanctioned and regulated. Last year when all conditions were at their worst, there were serious nuisances; and in the cove, or "back bay," and at one other spot along the railroad track, conditions must always be objectionable without special means of disposal. Here is where speedy relief is most urgently needed. If discharge into the Smith River is to be permissible a proper survey would determine how much sewer line would be required to carry the total discharge of the entire district beyond the railroad embankment. But this should not be positively recommended until we know more about the low water conditions of the Smith River, its depth, least rate of flow, etc.

In considering the broader question we face the actual condition that thousands of summer visitors are attracted to Wolfeboro, and the other famous resorts of the lake, because of the unlimited facilities for boating, swimming, fishing, etc, which the lake affords.

Public water supplies are taken from the lake at Alton Bay, and for the safeguarding of this the State Board has already made regulations. This is ten miles from Wolfeboro by water, through narrow passages and around a very irregular shoreline, with no pronounced currents toward Alton Bay, which in all probability is too remote to be menaced by existing conditions at Wolfeboro.

Without just now assenting to the proposition, the writer simply suggests, or raises the question whether the State Board will consider that the bordering communities, like cities on the seabound, have a natural right to discharge household and factory wastes into so large a body of fresh water which undoubtedly gives unlimited dilution when proper distribution is made. The proportionate degree of contamination is too minute to be considered, if water is not taken for personal use too near the points of discharge of sewage.

This being allowed, the local problems must deal with the best means of regulating the discharge of all wastes:—requiring individual owners to pipe their drainage well out beyond low water line; and for an aggregation of houses, where all can combine to deliver to a single and more remote point, to prescribe a proper collecting sewer and require all to coöperate to rid the neighborhood of offense.

It was evident by what was learned, that the public needs to be enlightened as to the right disposal of garbage and grease; especially that it must not be put into house drains or cesspools, but burned.

It is the presence of such material, where it should not be, that makes some drains and cesspools unnecessarily offensive.

It is evident from what precedes that definite advice cannot be given to the local board, especially if it should involve measures calling for considerable expenditure on part of the town or individuals, until after the situation has been carefully studied and further conference held with the local board and selectmen. And it is proper to repeat that whatever action is taken should be that which can be consistently followed in the future and which shall constitute a governing policy for all the lake region.

Respectfully submitted,

ROBERT FLETCHER,
Civil Engineer.
Member of the State Board of Health.

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Postscript.—December, 1912.

By request of the Wolfeboro Board of Health a survey was made, by an instructor and student of the Thayer School of Civil Engineering in August, of that part of the village where remedial operations are most needed, and a contour map prepared. Also the trustees of Brewster Academy had a plan made for a sewage tank to take care of the sewage from that institution independently, and this was constructed.

In the light of the experience at Sugar Hill, fully described in the *New Hampshire Quarterly Bulletin* for October, 1912,[1]—where a simplified and cheaper form of sewage tank has proved quite satisfactory in more than thirty cases (from summer cottages to hotels accommodating 500 people),—it seems now to be advisable to recommend similar constructions for Wolfeboro, both for private houses, hotels, business blocks and neighborhoods. The difficulties of the very low-level houses are serious; but, by proper attention given to each situation, and proper design and placing of tanks with due regard to the fluctuating lake level, the experience at Sugar Hill encourages us to believe that visible offense may be removed and the general situation made satisfactory.

R. F.

[1] And elsewhere in this biennial report.

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AN OUTBREAK OF TYPHOID FEVER AT DURHAM.

Early in December, 1911, the State Board of Health was notified of an outbreak of typhoid fever in the town of Durham, and an investigation of the cause was immediately instituted. The history of the case is interesting, in that it shows an unsuspected pollution of a water supply, which was responsible for nineteen cases of typhoid fever that developed within a short time after the contamination of the supply.

The history of the outbreak, briefly stated, is herewith given, accompanied by a sketch, which should be studied in order to understand more fully the exact situation.

The board requested Dr. H. N. Kingsford to go to Durham and to investigate the source of the outbreak and the conditions pertaining thereto. The following is his report:

HANOVER, N. H., December 15, 1911.

Irving A. Watson, M. D.,
Secretary State Board of Health,
Concord, N. H.

DEAR DOCTOR:—According to instructions, I went to Durham, N. H., on Friday, December 8, 1911, to investigate the cause of the outbreak of typhoid fever. Below is a report of my findings, and enclosed is a map and photographs illustrating the more important points.

The disease is confined to one small section of the town where there are no sewer conveniences. The rest of the town is well sewered. The infected area is supplied with water from the well where the windmill is situated, the water being pumped into the tank and from there distributed to the houses. The present cases are in the Gamma Theta, the Rand, Taisnes and the Italian's houses, these are all marked in red. There was a suspected case in the Cummins house about three to four weeks ago; a nurse, Mrs. F., was not very sick but had to give up her work and go to her home in Manchester, where she was under a physician's care for a time. A specimen of blood from her gives a positive Widal reaction, showing that she did have typhoid.

The drainage from the Cummins house was supposed to go into a cesspool, but it actually went directly on the surface and ran along as shown by black line on map, within four feet of the well at windmill and into a pond. The distance of windmill from the house is about two hundred feet, and the fall in ground about six feet. Along the bed of the course of this drainage the ground was soft and black and a distinct sewage odor was present. The Mathes house drainage is also along the same line, but at this time no one lives in that house.

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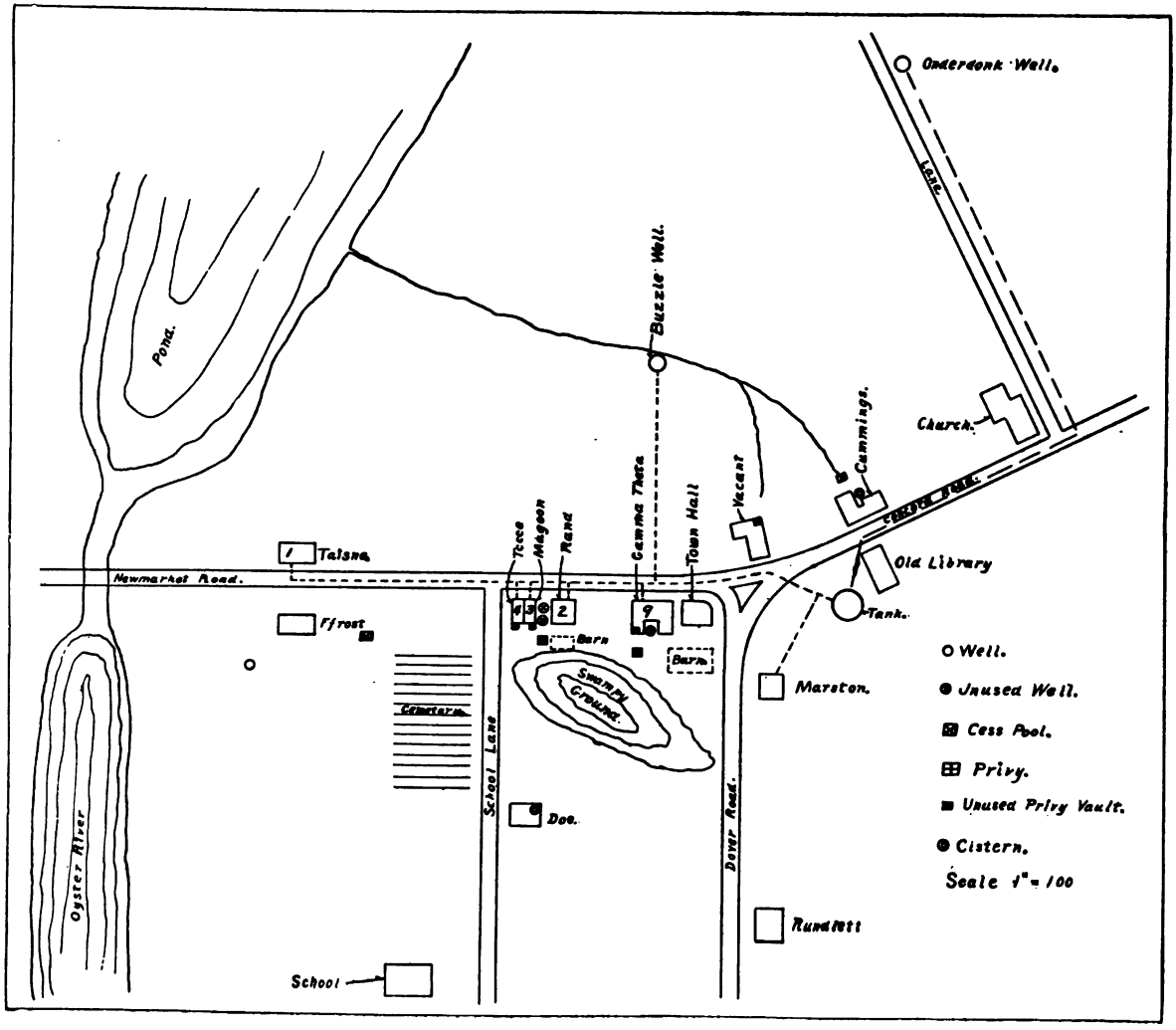

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The water in the well had become rather low, and water from the other sections of the town was let into the tank; the windmill was fixed is such a way it was not expected to punp, but when the wind blew from a certain direction the windmill would pump a little, and so some water from the well did get into the tank. The main water supply for the town is from two very deep driven wells, and, in my opinion, cannot become contaminated.

The drainage from the Magoon and the Rand house is directly on the surface. There is a cesspool between the two houses but it had not been cleaned out for over ten years. The sanitary conditions about these houses are the very worst I ever saw; the photographs will give some idea of the conditions.

The muck hole is a flat area of two or three acres, which has been taking filth for years, and there is no way for it to drain as the road is high above it, and there is no opening under the road, although a practically new road.

Of course as long as this condition exists there is great danger for anyone living in this vicinity. The school children are especially exposed; although the school is on a hill, it is within easy fly range.

In my opinion the original case was that of Mrs. F. at the Cummins house, and that the well became infected from drainage from that house, and that the other cases were caused by drinking this infected water.

The well should not only be closed but destroyed, as it is a surface well and can never be made safe. The tank should be cleaned out, and no water be used from it until colon free at the most distant taps.

A septic tank should be put in to take the sewage from this section of the town.

The wells and cesspool between the Rand and Magoon houses also should be filled up.

They already have a septic tank in good working order, for the rest of the town, and operated by the college.

I have talked these matters over with the local health officers, and they understand quite well what wants attending to. The local health officers and Professor Cardullo of the college were with me, and are very anxious to have things put into a sanitary condition.

H. N. KINGSFORD.

In order to coöperate as fully as possible with the local board of health and the authorities of the State College in restricting the disease and in improving the unsanitary conditions of the locality, the State Board of Health directed its chemist, Mr. C. D. Howard, to make a further investigation with the local health officers. The following is his report:

Dr. Irving A. Watson, Secretary,
State Board of Health.

DEAR SIR:—My examination of the water supply and sanitary conditions at Durham at date of December 19 revealed the following facts:

I find that following Doctor Kingsford's visit of the preceding week, construction is well along on a sewer line extending from the Gamma Theta House, near the Dover Road, to enter the Oyster River just below the dam. This sewer will skirt the edge of the muck-hole and will care for the sewage from the houses situated on this side of the street to the river.

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The accumulation of filth and rubbish back of these houses and including the muck-hole, which received much of the drainage from the typhoid cases, is to be covered by grading in with soil to a depth of several inches and all sewage will be taken from the hole. In addition it is proposed to immediately apply a solution of chloride of lime to the whole area, using a tank-wagon and hose.

The two wells in the rear of the tenement houses I find are in a very dirty condition and as these are but little better than cesspools, are not used and are to be filled up, it was, of course, unnecessary to take samples from them. The cesspool in the rear of the Gamma Theta House (an old well 25 feet deep) was being pumped out at the time of my visit and this will be filled up.

I examined conditions adjacent to the Onderdonk well and found nothing objectionable. This is a deep artesian well and I see no reason why the quality should be affected in any wise by surface drainage. There is but this one well connected with this system. This water has been pumped into the Burnham tank since about October 1, or possibly a little later, and has been the supply of all the houses in the infected district since that date. It seems, however, that though the Burnham (Buzzell) windmill was shut off and this well was not supposed to be contributing to the supply, in reality the mill did pump quite a little at times when the wind was favorable—as I myself had opportunity to observe. The pump rod has since been disconnected.

An interesting fact in this connection, serving to throw some light on what was regarded as a mystery for a time, is found in the arrangement of the Burnham pipe system. It was learned that at the Gamma Theta House, the tenements and the parsonage, the services are supplied by direct pumpage from the well, whereas at some of the other houses nearby, where no fever occurred—the Marston house, for instance—the draught is from the tank. Thus in the one case, the users received the undiluted water from the Burnham well at times, while in the other this water was always largely diluted by water from the Onderdonk well and there was opportunity for subsidence and consequent purification. Of course, the theory of the capacity of the individual for resistance could satisfactorily explain any such seeming inconsistency; but the above fact is of interest.

That the epidemic had its origin in an infection of the Burnham (Buzzell) well seems to be plainly indicated, there being abundant visual evidence that this well is being continuously polluted by sewage from the Cummings house. This water has uniformly afforded a poor analysis on previous examinations, the nitrate content generally being high, with frequently much organic matter and also a distinct "sink-drain" odor, with slimy sediment. At times, however, this water has given a fair analysis, aside from the ever-present high chlorine content and on account of nearness to tide-water we have been unable to attach the significance to this factor that we otherwise might have. So far as the chlorine content is concerned this is not appreciably greater than that of the Onderdonk and College deep well waters; in other ways, however, the composition of the latter differs greatly.

It is very probable that this Burnham water is fairly safe for drinking at times; at least, the quality has frequently been such as not to be very likely to cause injury to the health of the user. The case affords an excellent illustration, however, of the risk incurred in drinking a water, the analysis of which plainly indicates the existence of a communication with sewage drainage, even though the subsequent soil-filtration has resulted in the removal of most of the organic matter and harmful bacteria. If we might be sure that such condition was attributable to rich garden soil, or barn-yard drainage and that the soil-filtering process will go on normally at all times, then

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there may be scarcely any objection to the use of such water. In this particular case, however, it only wanted to have the germs of typhoid introduced into the normal sewage effluent, together with some disturbance of the soil-filtration, as for instance oversaturation from rains, when the well became inoculated and trouble ensued. Now it is possibly true that if the sewage from the Mathes and Cummings houses was *effectually* taken care of and matters so arranged that no objectionable drainage could come into the near vicinity of the well, the water of the latter might become fairly suitable for drinking. But these would be difficult matters to adjust satisfactorily and in any event, in the case of a supply to be used by the public, surface wells situated as this one is should not be considered; I am advised that this one is to be permanently abandoned.

The Onderdonk system, which is temporarily supplying the lower part of the village is but a private supply and it is probable it will be at once necessary for the town or other enterprise to sink another artesian well in this section. the latter being the only kind of supply of suitable quality likely to be obtainable.

Practically all of the rest of the village is supplied from three wells. These are: the Hoitt well—a surface well but unexposed to contamination and thus far affording an excellent analysis; the artesian well on the Pettee system, and the College artesian well. I understand that all of the Pettee supply is at present derived from the one artesian well, which is pumped continuously. In my opinion this well is not at present exposed to contamination and, all things considered, I see no reason for questioning the quality of this water

The College well is located close to the power house and but a few feet from a brook that receives more or less farm and stable drainage and, also at near this point, sewage from the college buildings. In fact, I was informed that a plan is under consideration involving the pumping of all of the college sewage to a point just below this well and there installing a septic tank. But on account of the danger of leakage through seams in the rock down into the water level from which this well is supplied, I am of the opinion that this would be a very undesirable thing to do. The construction of this well is such that no surface water can enter and there would seem to be no ground for regarding the water as other than wholly satisfactory at present. However, in order that we may be sure that the deep water level from which this well is supplied is unexposed to leakage from the surface through seams at any point, I have recommended that samples be submitted quarterly for a time, for the purpose of determining whether or not there is any tendency for the proportion of certain constituents to increase.

Respectfully,

C. D. HOWARD.

December 19, 1911.

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THE PRODUCTION, CARE AND SALE OF MILK IN NEW HAMPSHIRE.

The importance of a pure, safe milk supply to every community may be in part recognized when it is considered that with perhaps the single exception of bread, milk is used more generally and commonly than any other article of food. It is, therefore, essential that its production, care and distribution should be so safeguarded as to eliminate as far as possible all danger of contamination. This statement is emphasized by the fact that milk is one of the best of the media for the growth of germ life, disease germs and others, and that not infrequently has it been the source of the spread (in some cases to epidemic proportions) of such diseases as scarlet fever, typhoid fever, diphtheria, intestinal diseases of children, and, according to the views of some of the best authorities, tuberculosis.

The question then arises, What is being done in this state to protect the people against such dangers? First, it may be well to consider the Public Statutes, which provide as follows:

INSPECTION AND SALE OF MILK, AND SALE OF BUTTER AND CHEESE.

(Chapter 127 of the Public Statutes, as Amended in 1901, 1903 and 1909)

SECTION 1. The boards of health of cities shall be in charge of the inspection of milk, skim-milk and cream, and may appoint one or more persons as their agents for that purpose who shall act under their direction in their respective places, and who may be removed by them at any time. The compensation to such agents shall be fixed by said boards of health, but no milk inspector shall be paid for his services unless he is a registered chemist or is the holder of a certificate from the superintendent of the dairy department of the New Hampshire College of Agriculture and the Mechanic Arts, showing the said holder to be qualified to perform such work.

SECT. 2. The selectmen of towns may annually appoint one or more persons to be inspectors of milk, skim-milk and cream, under the same provisions and conditions as agents are appointed by boards of health.

SECT. 3. The boards of health of cities and the selectmen of towns may grant to any person who applies therefor and pays the sum of two dollars a license to sell milk, skim-milk and cream within their city or town, until the first day of June next following, and may renew such license annually in the month of May upon application and the payment of a like fee, providing said applicant will satisfy said boards of health or selectmen that he understands the care and handling of said products, and files the name and address of all his producers, and gives reasonable assurance that the cows from which the milk is taken are healthy, and are properly fed and cared for. The license and its renewal shall state the name of the party to whom granted,

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his residence, place of business, the names of all persons employed by him in carrying on the business, the number of carriages or other vehicles used, the name of the town for which it is granted, and the number of the license. It shall not be transferable, and may be revoked at any time for cause. The person to whom any license is granted shall cause his name, place of business, and the number of his license to be legibly placed on the outer side of all carriages and vehicles used in the business, and in the case of a merchant selling, or offering for sale, in a store, booth or market place, in a city or town in which said licenses are granted, said license and its renewals shall be posted in a conspicuous place in said merchant's place of business.

SECT. 4. Whoever goes about in carriages or makes a business of selling milk, skim-milk, or cream, in any such city or town, or offering for sale, or having in his possession with intent to sell, milk, skim-milk or cream, unless a license has first been obtained as provided in the preceding sections, shall be fined not more than ten dollars for the first offense; and for any subsequent offense he shall be fined fifty dollars, or be imprisoned not more than sixty days, or both; *provided, however*, that any person selling only the product of his own cows shall be exempt from paying any fee for such license.

SECT. 5. Every person selling milk, skim-milk, or cream, or offering such for sale in a store, booth, or market place in a city or town in which licenses are granted shall procure a license as provided in section 3. Any person so selling or offering for sale, who neglects to comply with this section, shall be punished as provided in section 4.

SECT. 6. The boards of health of cities, and their agents, the selectmen of towns and the inspectors appointed by them, may enter places where milk, skim-milk, or cream are stored or kept for sale, and into and upon carriages used for the conveyance thereof, and may take such samples of milk, skim-milk, or cream, as they may deem necessary, upon payment of the current price therefor, and may examine the milk, skim-milk, or cream there found; and, if requested, shall leave a sample of the same product, securely sealed, with the person from whom said sample was taken, and if they have reason to believe that any such milk, skim-milk, or cream is adulterated, they shall cause specimens thereof to be analyzed or otherwise satisfactorily tested, and shall make a record of the result of the analysis or test.

SECT. 7. They shall make a record of all licenses granted and renewed by them, which, together with all registries made with them, shall be open to public inspection; and shall pay to the treasurer of their city or town all fees received within thirty days after receipt.

SECT. 8. No dealer in milk, and no servant or agent of a dealer, shall sell, exchange, deliver, or have in his custody or possession with intent to sell, exchange or deliver, milk from which the cream or any part thereof has been removed, unless in a conspicuous place above the center upon the outside of every vessel, can, or package from or in which such milk is sold, the words "skimmed milk" are distinctly marked in letters not less than one inch in length. Whoever violates the provisions of this section shall be punished by the penalties provided in section 17 of this chapter.

SECT. 9. A record shall be made and kept by said boards of health and selectmen of each and every conviction in their respective cities and towns of any violation of the provisions of this chapter.

SECT. 10. Any board of health, or agent thereof, or selectman, or inspector appointed under the provisions of this chapter, who willfully connives at or assists in a violation of the provisions of this chapter shall be fined not more than three hundred dollars, or be imprisoned not more than sixty days, or both.

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SECT. 11. The preceding sections shall be in force only in such towns and cities as now have inspectors of milk, and those which may hereafter adopt the same, but nothing in this act shall be construed as affecting any one who may at the time of the passage of this act be a regularly elected inspector of milk in any city in this state, so as to cut short his present term of office, or vary his salary.

SECT. 12. Milk shall be bought and sold by wine measure, the standard for which shall be two hundred and thirty-one cubic inches to the gallon, and for subdivisions of the gallon in the same proportion.

SECT. 13. All measures or vessels used in the sale of milk shall be tried and proved by the standard of wine measure, and the quantity they hold agreeably to such standard shall be marked thereon. Any person selling any milk by any other than measures so tried, sealed and marked shall forfeit for each offense ten dollars.

SECT. 14. All milk cans used by persons engaged in the business of purchasing milk at wholesale shall be sealed annually by the sealer of weights and measures in the city or town where the purchaser resides; and no milk can shall be sealed which does not contain one or more quarts, and the capacity of the can shall be legibly marked upon it by the sealer.

SECT. 15. When milk is purchased by the can, such can shall hold eight quarts of milk and no more.

SECT. 16. Any person violating the provisions of the two preceding sections shall be fined not more than fifty dollars.

SECT. 17. If any person shall adulterate milk, skim-milk, or cream with water or otherwise to be sold, or shall sell or offer for sale, or have in possession with intent to sell, any adulterated or unwholesome milk, skim-milk, or cream, containing any coloring matter or preservative, or any milk produced from sick or diseased cows, or cows fed upon the refuse of breweries or distilleries, or any other substance which may be deleterious to the quality of milk, skim-milk, or cream, or shall sell, or offer for sale, or have in possession with intent to sell as pure milk, any milk from which the cream or a part thereof has been removed, he shall be fined not more than two hundred dollars, or imprisoned not more than sixty days, or both. And it shall be the duty of boards of health and milk inspectors to file the necessary information with the chief of police of the city or town, or the county solicitor of the county in which such city or town may be situated, and it shall be the duty of such chief of police and county solicitor to prosecute offenders under this act to final judgment and sentence.

SECT. 18. In all proceedings under this chapter if the milk is shown, upon analysis to contain less than twelve per cent. of milk solids, it shall be considered evidence of adulteration, or if in the case of skim-milk, it shall contain more than ninety-one per cent. of water and less than nine per cent. of milk solids exclusive of fat, it shall be considered evidence of adulteration, or if in case of cream it shall contain less than eighteen per cent. of butter fat, it shall be considered evidence of adulteration. Butter shall contain not less than eighty per cent. of milk fat and not more than sixteen per cent. of water. Renovated butter shall be branded or labeled with the words "Renovated Butter."

An analysis of the foregoing laws shows that:

1. The appointment of milk inspectors in cities is placed in the hands of the Mayor and board of aldermen; and in the towns of the

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state, the selectmen *may* make such appointments. It will be seen, therefore, that such action is not compulsory under the law.

2. The boards of health of cities, and the selectmen of towns *may* grant licenses, under certain conditions, to sell milk, skim-milk, and cream in their respective localities.

3. Boards of health, selectmen, or their agents may enter places where milk is stored or kept for sale, and they may take samples to be analyzed or otherwise satisfactorily tested.

4. If a dealer sells milk that has been deprived of its cream, or a part thereof, the can or vessel must be labeled "Skim-Milk."

5. The general provisions relating to the inspection of milk to be in force only in such towns and cities as had inspectors at the time the law was passed (ten years ago) or which have since adopted the law.

6. Section 17 provides that any person found guilty of adulterating milk, skim-milk, or cream, or has in his possession with intent to sell any adulterated or unwholesome milk, or one containing coloring matter, preservative, or that was produced from sick or diseased cows, shall be fined or imprisoned, or both. The last section of the law establishes legal standards.

As will be seen, the actual effective working agencies provided for by this law, are not put into action except in a very few instances. Therefore, the law, as applied to the entire state, is in a very large measure inoperative.

It is at a comparatively recent date that any great public interest has been aroused to the necessity of a safer and better milk supply; but even now, except in some of the cities of the state, very little effort is being made in this direction.

The most effective work along this line is being done in the cities of Concord and Manchester, and during the past year it has also been inaugurated in the cities of Berlin and Keene. The regulations that have been adopted by these cities are herewith given:

CITY OF MANCHESTER.

Sanitary Milk Rules.

Regulations of the Board of Health for the sale and distribution of milk in the City of Manchester.

Rule No. 1. No milk shall be sold, offered for sale, or distributed in the city of Manchester which was drawn from cows within fifteen days before or five days after parturition.

Rule No. 2. No milk for sale or distribution shall be stored, cooled, strained or or mixed in any barn or room which is occupied by horses, cows, or other animals,

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unless the dairy room or storage room is separated from other parts of the building, and provision made for the exclusion of dust and flies, to the satisfaction of the board of health.

RULE No. 3. No person, firm or corporation shall sell or offer, expose or keep for sale, in any vehicle, shop, store or other place where goods and merchandise are sold, milk or cream, unless the same is sold or offered, exposed or kept for sale, in tightly closed or capped bottles or receptacles which have been approved by the board of health.

Milk, cream or skim milk kept for sale in any shop, store, bakery, restaurant, market or establishment, shall be stored and kept in a covered box, cooler or refrigerator, and the temperature shall be at all times not more than 55 degrees Fahrenheit.

Nothing contained herein shall prevent the sale of milk or cream from cans, crocks, coolers or other receptacles in restaurants or hotels when the milk or cream is to be consumed in the restaurant or hotel by guests or patrons ordering the same.

RULE No. 4. All wagons, sleighs, or other vehicles used in conveying milk, cream or skim milk for distribution or sale or collecting from raisers, shall be covered and kept in a cleanly condition free from odors, and swill or any other refuse or decaying vegetable or animal matter shall not be carried on said wagon, sleigh or other vehicle.

RULE No. 5. All bottles, cans, or vessels of any sort used in the distribution, or sale or collection or preparation of skim milk or cream, shall be cleansed and scalded or sterilized before they are used again for the same purpose.

No bottles shall be filled except at the dairy or creamery.

RULE No. 6. Immediately on the occurrence of any case of scarlet fever, diphtheria, typhoid fever, or any other infectious disease, either in himself, his family or among his employes or their immediate associates, every person engaged in the production, distribution, or sale of milk, skim milk or cream, shall notify the board of health of Manchester, and at the same time shall suspend the sale of milk, skim milk or cream, until authorized to resume the same by the said Manchester Board of Health.

No bottles, cans, or vessels used shall be removed from a private house, tenement or apartment, or place wherein a person has infectious disease, except with the consent of said board of health.

RULE No. 7. No person by himself, or by his servant or agent, or as the servant or agent of any other person, firm or corporation, shall in the city of Manchester, sell, exchange or deliver, any milk, skim milk or cream, which contains more than 500,000 bacteria per cubic centimeter, or which has a temperature higher than 55 degrees Fahrenheit.

The latter part of this rule in regard to temperature does not apply to raisers who deliver milk which is distributed warm within one hour from the time it is drawn from the cow.

RULE No. 8. Any person, firm or corporation who shall violate any of the provisions of the above rules shall be fined ten dollars ($10.00) for each offense.

G. LAFONTAINE,
WM. K. ROBBINS,
JOHN B. CAVANAUGH,
Board of Health of Manchester.

July 2, 1912.

In Board of Mayor and Aldermen. Approved.

ARTHUR W. PHINNEY,
City Clerk.

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CITY OF CONCORD.

The regulations in force in the City of Concord were adopted in 1907, in the face of strong opposition on the part of the milk producers, as has been the case wherever an attempt has been made to license producers and to require that milk shall be produced under reasonable sanitary regulations.

An inspector was chosen to carry out the provisions of the regulations, and in so doing he has visited the dairies, with the city health officer, has made bacteriological examinations of the milk, and has exercised, in a general way, a supervision, both executive and instructive, so that today there is little or no opposition to the enforcement of the regulations; but, on the other hand, the coöperation of the producers has been secured in very many instances.

Following are the regulations referred to:

CITY OF CONCORD.

In the Year of Our Lord One Thousand Nine Hundred and Seven.

AN ORDINANCE REGULATING THE SALE AND CARE OF MILK.

Be it ordained by the City Council of the City of Concord as follows:

SECTION 1. The condition under which every cow is kept whose milk is sold or exposed for sale in the City of Concord shall be made known to the board of health, if said board shall deem it necessary.

SECT. 2. No milk shall be sold or offered for sale unless the cow is free from disease dangerous to the public health.

SECT. 3. No milk kept for sale shall be stored, strained, cooled or mixed in any room used in whole or in part for sleeping purposes or for the stabling of horses or cattle or other animals or for the storage of manure, offal or other offensive matter.

SECT. 4. All rooms in which milk is stored, cooled, strained or mixed shall be kept constantly clean. Proper apparatus shall be provided for washing or sterilizing all utensils used in handling milk and such utensils shall be washed with boiling water or sterilized by steam after being so used.

SECT. 5. No urinal, water-closet or privy shall be located in the rooms mentioned in the preceding sections or so situated as to pollute the atmosphere of said rooms.

SECT. 6. All milk produced for the purpose of sale shall be strained and cooled as soon as it is drawn from the cow.

SECT. 7. Milk kept for sale shall at all times register on test a temperature not higher than 50 degrees Fahrenheit, and shall be stored in a covered cooler, box or refrigerator.

SECT. 8. All cans, bottles or other vessels of any sort used in the sale or handling of milk shall be cleaned or sterilized before they are used again for the same purpose.

SECT. 9. No person shall use a milk vessel as a container for any substance other than milk.

SECT. 10. Every person engaged in the production, storage, transportation, sale, delivery or distribution of milk, immediately on the occurrence of any case or cases of infectious disease, either in himself or in his family or amongst his employees

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or their immediate associates, or within the building or premises where milk is stored, sold or distributed, shall notify the Health Officer.

SECT. 11. No person having an infectious disease, or having recently been in contact with a person having an infectious disease, shall milk or handle cows, measures or other vessels used for milk intended for sale or in any way take part or assist in handling milk intended for sale until all danger of communicating such disease to other persons shall have passed.

SECT. 12. No vessels which have been handled by persons suffering from such an infectious disease shall be used to hold or convey milk until they have been thoroughly sterilized.

SECT. 13. No bottle, can or receptacle used for the reception or storage of milk shall be removed from a private house, apartment or tenement wherein a person has an infectious disease.

SECT. 14. No person, by himself, or by his servant or agent or as the servant or agent of any other person, firm or corporation shall bring into the City of Concord for the purposes of sale, exchange or delivery or sell, exchange or deliver any milk, skimmed milk or cream which contains more than 500,000 bacteria per cubic centimeter, or which has a temperature higher than fifty degrees Fahrenheit.

SECT. 15. The board of health shall keep a record of all inspections made under or by virtue of this ordinance and of the results of such inspections; and shall make a report each month to the city council showing all inspections made, and the results of such inspections, during the preceding month.

SECT. 16. Whoever violates the above regulations is liable to a fine not exceeding ten (10) dollars.

SECT. 17. All ordinances or parts of ordinances inconsistent with this ordinance are hereby repealed and this ordinance shall take effect January 1, 1908.

Passed October 14, 1907.

CITY OF BERLIN.

In 1909 the City of Berlin enacted an ordinance to govern the care and sale of milk, being an exact copy of the ordinance adopted by the City of Concord on October 4, 1907, as given above.

A short time previous to the adoption of this ordinance, the city provided for the employment of a health officer and milk inspector, who should devote his entire time to the work. This was a very progressive measure on the part of the city, and has resulted not only in the better enforcement of the health regulations, but also in the production of milk under improved sanitary conditions. The sources of the milk supply are inspected from time to time and the producers given instruction in the proper handling of their product.

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CITY OF KEENE.

ORDINANCE.

In the Year of Our Lord One Thousand Nine Hundred and Ten.

An Ordinance Regulating the Production, Care and Sale of Milk, Food and Food Substances and Granting the Board of Health power to employ Inspectors.

Be it ordained by the City Councils of the City of Keene, as follows:

SECTION 1. The condition under which every cow is kept whose milk is sold or exposed for sale in the City of Keene shall be made known to the board of health, if said board shall deem it necessary.

SECT. 2. No milk shall be sold or offered for sale unless the cow from which the same was drawn is free from disease dangerous to the public health, and any cow shall be considered diseased within the meaning of this section which shall show reaction from the tuberculin test. The presence of a diseased cow producing milk in a herd from which milk is sold shall be prima facie evidence of violation of this section.

SECT. 3. The inspector or inspectors hereinafter provided for shall at least once in each year examine each cow the milk from which is sold or offered for sale in the City of Keene and, if in his judgement, there is reason to believe that any such cow is afflicted with tuberculosis he may direct that she shall be subjected to the tuberculin test, and thereafter no milk shall be sold from said cow until such test has been made and a certificate of a registered veterinary showing the result of such test shall have been furnished to the board of health or to said inspector.

SECT. 4. No milk shall be sold, or offered for sale, which has been drawn from a cow fed on any substance in a state of putrefaction, or on any unwholesome food, or from cows kept in a crowded or unhealthy condition.

SECT. 5. No milk kept for sale shall be stored, strained, cooled or mixed in any room used in whole or in part for sleeping purposes or for the stabling of horses or cattle or other animals, or for the storage of manure, offal or other offensive matter.

SECT. 6. All rooms in which milk is stored, cooled, strained or mixed shall be kept constantly clean. Proper apparatus shall be provided for washing or sterilizing all utensils used in handling milk and such utensils shall be washed with boiling water or sterilized by steam after being so used.

SECT. 7. No urinal, water-closet or privy shall be located in the rooms mentioned in the preceding sections or so situated as to pollute the atmosphere of said rooms.

SECT. 8. All milk produced for the purpose of sale shall be strained and cooled as soon as it is drawn from the cow, provided, however, that producers may sell milk without previous cooling to call customers, if said milk is sold and delivered within two hours after milking.

SECT. 9. Milk kept for sale at any milk depot or room shall at all times register on test a temperature not higher than fifty degrees Fahrenheit, and shall be stored in a covered cooler, box, or refrigerator, except as provided in section 8.

SECT. 10. All cans, bottles or other vessels of any sort used in the sale or handling of milk shall be cleaned or sterilized before they are used again for the same purpose.

SECT. 11. No person shall use a milk vessel as a container for any substance other than milk.

SECT. 12. No person shall bottle milk for sale upon any wagon or elsewhere than at the regular bottling place of a producer or dealer.

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SECT. 13. Every person engaged in the production, storage, transportation, sale, delivery or distribution of milk, immediately on the occurrence of any case or cases of infectious disease, either in himself or in his family or amongst his employees or their immediate associates, or within the building or premises where milk is stored, sold or distributed, shall notify the board of health.

SECT. 14. When any person engaged in the production, storage or distribution of milk suffers from any contagious or infectious disease, or when such disease exists amongst employees or their immediate associates, or within any building used in any way in the milk business, no milk shall be then or thereafter sold or delivered from such dairy or milk establishment except by permission of the board of health, and in accordance with any requirements which said board may make.

SECT. 15. No person who has anything to do with the production or handling of milk, which is sold of kept for sale, shall enter any place where exists any contagious or infectious disease, nor have any communication with any person who is an occupant of such infected place.

SECT. 16. No vessels which have been handled by persons suffering from an infectious disease shall be used to hold or convey milk until they have been thoroughly sterilized.

SECT. 17. No bottle, can or receptacle used for the reception or storage of milk shall be removed from a private house, apartment or tenement wherein a person has an infectious disease.

SECT. 18. No person, by himself, or by his servant or agent or as the servant or agent of any other person, firm or corporation shall bring into the City of Keene for the purposes of sale, exchange or delivery or sell, exchange or deliver any milk, skimmed milk or cream which contains more than 250,000 bacteria per cubic centimeter, or which has a temperature higher than fifty degrees Fahrenheit.

SECT. 19. No milk, or the product of milk drawn from a cow within fifteen days before or five days after calving shall be sold or offered for sale.

SECT. 20. No person, firm or corporation shall within the limits of the City of Keene manufacture for sale, sell, or keep for sale any article of food or substance to be used in the manner of food or drink, under unclean or unsanitary conditions.

SECT. 21. It shall be deemed a violation of the foregoing section if the premises where any such food or food substance is stored or kept for sale are not kept well ventilated and free from foul smells and odors; or if fragments of meat, bone or other refuse or waste matter, whether animal or vegetable, are allowed to accumulate where the same may contaminate the atmosphere, or where such food or food substance, manufactured, sold, or kept for sale, may come in contact with the same; or if the receptacles containing such food or food substance, or the benches, counters, scales, tools and other objects with which such food or food substance comes or may come in contact are not kept free from dirt or filth.

SECT 22. The city councils shall elect on the first day of September and annually thereafter, a registered veterinary to make periodical inspections under the direction of the board of health, of places where food and food substances are manufactured, sold, or kept for sale and where milk is produced, kept or sold, for the purpose of facilitating the enforcement of the provisions of this ordinance, and the provisions of chapter 48 of the Laws of 1907, and other laws or ordinances relating to the purity of foods or food substances, or to the production, care or sale of the same; the salary of said inspector to be fixed at the sum of three hundred dollars per annum, payable in equal monthly payments.

Passed August 10, 1910.

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SECT. 23. No person shall hinder or obstruct any member of the board of health, or any inspector appointed by said board when engaged in making any inspection for the purpose of enforcing the provisions of this ordinance, or any laws or ordinances relating to the purity of foods and food substances, or to the production, care and sale of the same.

SECT. 24. The board of health shall keep a record of all inspections made by them for the purpose of enforcing the provisions of sections 20 and 21 of this ordinance and the provisions of chapter 48 of the Laws of 1907, which disclose the existence of unclean or unsanitary conditions, or the sale or keeping for sale of adulterated, diseased or impure foods. They shall also keep a record of all inspections made by them for the purpose of enforcing the provisions contained in the first nineteen sections of this ordinance; and they shall at least twice in each year make a report to the city councils setting forth the information contained in the records so kept and the results of such inspections.

SECT. 25. Whoever violates any of the provisions of this ordinance shall be fined not more than twenty dollars.

SECT. 26. This ordinance shall take effect October 1, 1910.

Passed June 2d, 1910.

EVERETT N. COLBY,
President Common Council.
JOHN E. BENTON,
Mayor.

A true copy. Attest:

FRANK H. WHITCOMB.

CITY OF DOVER.

An Ordinance Regulating the Sale of Milk for and within the City of Dover.

Be it Ordained by the City Councils of the City of Dover:

SECTION 1. All stables in which cows are kept where the milk from such cows is sold or offered for sale within the limits of the City of Dover, shall be subject to inspection at any and all times by members of the board of health. Such stables shall be properly ventilated and lighted, the tie-ups shall be whitewashed at least once each year, and shall be maintained agreeably to such orders, rules and regulations as the board of health may, from time to time, prescribe.

SECT. 2. No milk shall be stored or cooled in any well, drinking trough for animals, or in any receptacle located in any barnyard, or in any other manner contrary to the orders of the board of health.

SECT. 3. All dairies or other rooms in which milk is stored, cooled, strained, bottled or mixed, and all utensils used therein, shall be kept in a perfectly clean and sanitary condition.

SECT. 4. No person shall use any milk vessel as a container for any substance other than milk, skimmed-milk or cream; and any and all cans, measures, or other metallic utensils used for holding milk, must be kept clean and free from rust. No bottle, can or other receptacle from which milk shall have been taken, shall be again used for delivery purposes until the same shall have been thoroughly cleansed.

SECT. 5. It shall be the duty of the executive officer of the board of health to inspect any and all utensils, teams or other vehicles used or employed in the delivery of milk within the limits of the City of Dover, or in the preparation and delivery of cream or butter, and also all stores, depots, or places where milk, cream or butter is

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sold or produced, for the purpose of enforcing the provisions of this ordinance; and it shall be his duty of said officer to commence and prosecute all actions for the violation of the same.

SECT. 6. No milk at a temperature higher than fifty degree Fahrenheit shall be delivered within the limits of the City of Dover, to any customer, store or market.

SECT. 7. No person, firm or corporation delivering milk in bottles or cans, shall leave any such bottle or can with any person afflicted with an infectious disease, or at any premises where any such disease may exist.

SECT. 8. No milk, cream, skimmed-milk, or butter, shall be carried on any wagon or other vehicle unless the same shall be clean and free from offensive odors, and no wagon or other vehicle used for such purpose shall at any time be employed to carry swill, garbage, or other unwholesome or deleterious matter.

SECT. 9. No person shall sell or offer for sale any diluted or adulterated milk, or sell or offer for sale any milk from which the cream or any part thereof has been removed except the same be sold as skimmed-milk. And all milk containing any sediment, manure, bedding, hair, of other foreign matter, and all milk produced from diseased or sick animals, will be deemed as adulterated under this ordinance.

SECT. 10. No urinal, water closet or privy shall be located in any room in which milk is kept or stored, or shall be so situated as to pollute the atmosphere of said room.

SECT. 11. No person having an infectious disease, or having recently been in contact with a person having an infectious disease, shall milk or handle cows, measures, or other vessels used for milk intended for sale, or in any way take part or assist in handling milk intended for sale within the limits of the City of Dover, until all danger of communicating such disease shall have passed.

SECT. 12. Whoever violates the provisions of this ordinance, or either of them, shall, upon conviction thereof, be subject to a fine of not more than ten dollars.

Passed October 3, 1912.

CITY OF SOMERSWORTH.

The board of health of Somersworth reports that there are no rules or regulations in force in that city relative to the production, care and sale of milk.

CITY OF NASHUA.

The board of health of the City of Nashua reports that there is no city ordinance relating to the production and distribution of milk, and, further, that the board instructed the milk inspector, at the time of his appointment, to be guided by the state law.

A communication was addressed to Mr. George Spillane, milk inspector of the City of Nashua, asking if he were carrying out any established rules or regulations; to what extent inspections were being made, and if analytical examinations of milk were made from time to time.

In response, Mr. Spillane states that "inspections are made on an average of once a month. Milk brought into our city is anlayzed from time to time."

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FINANCIAL STATEMENT.

EXPENSES OF THE STATE BOARD OF HEALTH.

For the Year Ending August 31, 1911.

Salary of Secretary	$2,500.00
Salary of Clerk	500.00
Expenses of Board, Incidentals and Office Supplies	444.41
Printing Blanks	70.05
Printing Report	996.11
Total	$4,510.57

Expenses for the Year Ending August 31, 1912.

Salary of Secretary	$2,500.00
Salary of Clerk	354.15
Incidentals	442.92
Printing Blanks	296.53
Total	$3,593.60

STATE LABORATORY OF HYGIENE.

Expenses for the Year Ending August 31, 1911.

Salaries (2 Chemists)	$2,700.00
Salaries (2 bacteriologists)	1,800.00
Printing Blanks	391.91
Incidentals	1,100.00
Total	$5,991.91

Expenses for the Year Ending August 31, 1912.

Salaries of Chemists (2)	$2,750.00
Salaries of Bacteriologists (2)	1,800.00
Incidentals	1,100.00
Printing	361.44
Total	$6,011.44

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SANITARY INSPECTION SERVICE.

Expenses for the Year Ending August 31, 1911.

Services and Expenses of Inspectors	$1,911.87
Incidental Expenses	571.83
Total	$2,483.70

Expenses for the Year Ending August 31, 1912.

Services and Expenses of Inspectors	$1,934.87
Incidental Expenses	513.60
Total	$2,448.47

STATEMENT OF THE OPERATION OF THE EMBALMER'S LAW.

Receipts.

Balance as per last Report	$184.34
Received for Licenses, 1911	80.00
Received for Licenses, 1912	55.00
Total	$319.34

Expenses.

Paid for postage, printing, etc., 1911	$76.90
Paid for postage, printing, etc., 1912	69.75
Total Expenditures	$146.65
Balance	172.69
Total	$319.34

Epidemic Fund Expenditures.

For the Fiscal Year 1909 (Smallpox)	$2,066.93
For the Fiscal Year 1910 (Smallpox)	836.28

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INDEX.

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INDEX.

	PAGE
Acworth, water supply	5
Allenstown, water supply	11
Alstead, water supply	5
Alton, water supply	12
Amherst, water supply	13
proposed, report on	142
Andover, water supply	14
Animals, infectious diseases of	202
Antrim, water supply	16
Ashland, water supply	17
Atkinson, water supply	17
Bacteriological department, report of, by Charles Duncan, M. D.	189
work, 1911, 1912	xvii
Barnstead, water supply	18
Bartlett, water supply	18
Bath, water supply	19
Belmont, water supply	20
Bennington, water supply	20
Berlin, milk ordinance	232
water supply	21
Bethlehem, water supply	24
Births, 1910, 1911	vi
Boscawen, water supply	24
Bow, water supply	25
Bradford, water supply	25
Bristol, water supply	25
Bulletin of the state board of health, the quarterly	vi
Butter, sale of, law	226
Canaan, water supply	25
Candia, water supply	27
Center Harbor, water supply	27
Charlestown, water supply	28
Cheese, sale of, law	26
Chester, water supply	30
Claremont, water supply	30
Colebrook, water supply	33
Concord, milk ordinance	231
water supply	33
Conway, water supply	36
Cornish, water supply	37

Digitized by Google

	PAGE
Croydon, water supply	37
Cup, the common drinking, law	xviii
Danbury, water supply	38
Deaths, 1910, 1911	vi
Derry, water supply	38
Diphtheria, 1910, 1911	ix
cultures examined	194
Divorces, 1910, 1911	vi
Dover milk ordinance	235
water supply	39
Drugs, conditions obtaining in connection with the sale of	180
examinations, classified	171
Duncan, Dr. Charles, Report on bacteriological department	189
Durham, typhoid fever at	221
water supply	42
Enfield, water supply	45
Epping, water supply	47
Epsom, water supply	48
Examinations, bacteriological, miscellaneous	203
Exeter, water supply	49
Farmington sewer problem	212
water supply	50
report on	149
Fisher, Prof. Irving, letter from	155
Fitzwilliam, water supply	52
Fletcher, Prof. Robert, Report on Free Flowing Sewage Tanks	153
Food adulteration, present extent of	177
and drug work	xvii
and liquor inspection	169
examined, table showing number and varieties of	169
inspections, nature of illegality found	173
prosecutions	174, 176
Francestown, water supply	52
Franconia, water supply	53
Franklin, water supply	54
Freedom, water supply	55
Free Flowing Sanitary Sewage Tanks, by Robert Fletcher, Ph. D., C. E.	153
Gilman Pond, regulations for the protection of the purity of the waters of	139
Gilmanton, water supply	56
Goffstown, water supply	56
Gonorrhœa, specimens examined	202
Gorham, water supply	57
Grantham, water supply	58
Greenfield, water supply	59
Greenville, water supply	59
Groveton, water supply	94
Hampstead, water supply	60
Hampton, water supply	61
Hancock, water supply	61

Digitized by Google

PAGE

Hanover, water supply 62
Haverhill, water supply 62
Hebron, water supply 65
Henniker, water supply 65
Hill, water supply 66
Hillsboro, water supply 66
Hinsdale, water supply 67
Hooksett, water supply 67
Hopkinton, water supply 68
Hotels and boarding houses, inspection of water supplies 126
Howard, Charles D., Report on food, drug, and liquor inspection 169
Inspection of water supplies at summer hotels and boarding houses 126
Hudson, water supply 69
report on 151
Hypochlorite treatment applied to Laconia water supply 143
Inspection of water supplies at summer hotels and boarding houses, by Charles D. Howard, Chemist 126
Inspections, sanitary, result of 208
Jackson, water supply 70
Jaffrey, water supply 70
Keene, milk ordinance 233
water supply 71
Keyzer Pond, and Long Pond, regulations for the protection of the purity of the waters of 140
Kingston, water supply 73
Laconia, water supply 73
hypochlorite treatment of 143
Lancaster, water supply 78
Lead pipe in connection with summer resort water supplies, statistics in connection with 135
Lebanon water supply 78
Lincoln water supply 80
Liquors, examinations for state license commission 181
reimbursements for 184
Lisbon, water supply 80
Littleton, water supply 82
Londonderry, water supply 82
Lunacy, board of commissioners of xx
Lyme, water supply 83
Lyndeboro, water supply 83
Madbury water supply 84
Madison water supply 84
Malaria, specimens of blood examined 203
Manchester, sanitary milk rules 229
water supply 84
Marlboro, water supply 87
Marriages, 1910, 1911 vi
Measles, 1910, 1911 x

Digitized by Google

PAGE

Meredith, water supply 87
village, report of chemist on 141
Meriden, water supply 101
Merrimack, water supply 88
Milford, water supply 89
Milk, inspection, law 226
summary 171
inspectors in cities, appointment of, law 226
ordinance, Berlin 232
Dover 235
Concord 231
Keene 233
Manchester 229
Nashua 236
production, care and sale of in New Hampshire 226
Nashua, milk ordinance 236
water supply 89
report on 147
Newcastle, water supply 91
Newfields, water supply 91
New Hampton, water supply 91
New Ipswich, water supply 92
New London, water supply 92
Newmarket, water supply 93
Newport, water supply 94
correspondence in connection with 136
Northumberland, water supply 94
Northwood, water supply 95
Nottingham, water supply 95
Orford, water supply 96
Ossipee, water supply 96
Pembroke, water supply 96
Peterboro, water supply 100
Pittsfield, water supply 100
Plainfield, water supply 101
Plaistow, water supply 102
Plymouth, water supply 102
Poliomyelitis, 1909–1912 xii
Portsmouth, water supply 103
Prosecutions instituted by the state board of health in connection with the food and drugs law 174, 176
Purrington, Wallace F., Inspector, report of 207
Rabies, 1911, 1912 xvi
Raymond, water supply 104
Report, secretary's v
Report of Food, Drug and Liquor Inspection, by C. D. Howard, Chemist .. 169
Report of Inspector Wallace F. Purrington 207
Richmond, water supply 105
Rindge, water supply 105

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PAGE

Rochester, water supply 105
Rollinsford, water supply 107
Rumney, water supply 107
Salem, water supply 107
Scarlet fever, 1910, 1911 x
Sewage tanks, free flowing sanitary 153
Sewer problem of Farmington 212
Wolfeboro 216
Smallpox, 1911, 1912 xiv
Somersworth, milk ordinance, none 236
water supply 108
Stark, water supply 110
State board of health, *personnel* iii
State laboratory of hygiene, *personnel* iii
Statistics, vital, registration v
Stewartstown, water supply 110
Stratford, water supply 110
Sugar Hill, free flowing sewage tanks at 153
Sullivan, water supply 112
Summer resort, water supplied, summary of investigations 134
Sunapee, water supply 111
Sutton, water supply 112, 139
Swanzey, water supply 113
Temple, water supply 113
The production, care and sale of milk in New Hampshire 226
Tilton, water supply 114
Troy, water supply 115
Tuberculosis, law providing for the registration of vii
percentage of deaths from by age periods 194
specimens of sputum examined 190
Typhoid fever, 1910, 1911 ix
at Durham 221
specimens of blood examined 199
urine examined 203
Unity, water supply 116
Urines, typhoid, examined 203
Wakefield, water supply 116
Walpole, water supply 116
Warner, water supply 118
Warren, water supply 119
Water supplies at summer hotels and boarding houses .....
inspection of 126
resorts, lead pipe in connection with 135
summary of investigations 134
examination of 3
interpretation of analyses 127
of towns and cities ..... 3 *et seq*
public and private xvi
special reports on ..... 126 *et seq*

Digitized by Google

PAGE

Water supplies, standard of quality required 126
summary of examinations 5
Weare, water supply 119
Whiskey, etc., labeling of. Food inspection decisions #113 182
Whitefield, water supply 119
Whooping-cough, 1910, 1911 xi
Wilmot, water supply 120
Wilton, water supply 120
Wolfeboro, sewer problem 216
water supply 122
Woodstock, water supply 122

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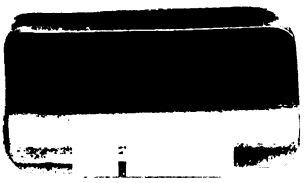

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